REDEFINING COMBAT MISSION REPORTING IN CONTEMPORARY OPERATIONS: FOCUSING THE AIR COMPONENT'S PROCESS IN SUPPORT OF THE JOINT WARFIGHTER

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As originally conceived in World War I, combat reporting from tactical aircraft has the potential to provide critical information concerning friendly operations and enemy activity to enhance situational awareness, supporting force protection and operations planning. While the technology used to observe and report information has evolved considerably since 1918, the basic concept of a narrative report based on post-mission intelligence debriefing remains. This thesis examined what modifications should be made to the Combined Force Air Component Commander's mission reporting standards and processes to produce mission reporting capable of satisfying joint information requirements at the strategic, operational, and tactical levels of conflict. The thesis explored the potential of tactical air reporting to satisfy joint information requirements throughout full spectrum operations, and presented a framework of information and reporting requirements based on modern aircraft capabilities set against the contemporary operating environment. An examination of the existing mission reporting process, including facilitators, information processing systems, and messages was used to determine suitability of the air component's existing reporting architecture. The thesis concluded with recommendations to increase the flow of information throughout the joint force and shorten reporting timelines to provide actionable information from focused collection efforts.

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

REDEFINING COMBAT MISSION REPORTING IN CONTEMPORARY OPERATIONS: FOCUSING THE AIR COMPONENT'S PROCESS IN SUPPORT OF THE JOINT WARFIGHTER, by Major Christopher P. Bell, 101 pages.

As originally conceived in World War I, combat reporting from tactical aircraft has the potential to provide critical information concerning friendly operations and enemy activity to enhance situational awareness, supporting force protection and operations planning. While the technology used to observe and report information has evolved considerably since 1918, the basic concept of a narrative report based on post-mission intelligence debriefing remains. This thesis examined what modifications should be made to the Combined Force Air Component Commander's mission reporting standards and processes to produce mission reporting capable of satisfying joint information requirements at the strategic, operational, and tactical levels of conflict. The thesis explored the potential of tactical air reporting to satisfy joint information requirements throughout full spectrum operations, and presented a framework of information and reporting requirements based on modern aircraft capabilities set against the contemporary operating environment. An examination of the existing mission reporting process, including facilitators, information processing systems, and messages was used to determine suitability of the air component's existing reporting architecture. The thesis concluded with recommendations to increase the flow of information throughout the joint force and shorten reporting timelines to provide actionable information from focused collection efforts.

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My wife Kristan has had to say the words, "Not now, Daddy's writing" far too many times over the last 10 months. The sacrifices she has made this year, and the preceding 11, total a debt I cannot possibly repay. She and our daughters Madison and Jaime have been my inspiration and source of sanity while struggling through this project. I offer my sincere gratitude for forgiving lost weekends and late nights, and enduring my slow and obsessive writing process.

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ACRONYMS

ACF	Analysis, Correlation, and Fusion
AFCENT	Air Forces Central
ASOC	Air Support Operations Center
ATO	Air Tasking Order
BCD	Battlefield Coordination Detachment
BDA	Battle Damage Assessment
CAOC	Combined Air and Space Operations Center
CCIR	Commander's Critical Information Requirement
CFACC	Combined Force Air and Space Component Commander
CFC	Combined Force Commander
CFLCC	Combined Force Land Component Commander
CIDNE	Combined Information Data Network Exchange
COIN	Counterinsurgency
CRC	Control and Reporting Center
EEI	Essential Element of Information
FFIR	Friendly Force Information Requirement
FM	Field Manual
GLO	Ground Liaison Officer
HUMINT	Human Intelligence
IMINT	Imagery Intelligence
INFLTREP	Inflight Report
IR	Information Requirement
IRD	Intelligence Reporting Directive

ISR	Intelligence, Surveillance and Reconnaissance
ISRD	Intelligence, Surveillance and Reconnaissance Division
JP	Joint Publication
MANPADS	Man Portable Air Defense System
MAT	MISREP Analysis Tool
MCO	Major Combat Operations
MCWP	Marine Corps Warfighting Publication
MISREP	Mission Report
NAI	Named Area of Interest
NTISR	Non-Traditional Intelligence, Surveillance and Reconnaissance
PIR	Priority Intelligence Requirement
SAFIRE	Surface-to-Air Fire
SIGINT	Signals Intelligence
SIPRNET	Secure Internet Protocol Routing Network
USAF	United States Air Force

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CHAPTER 1

INTRODUCTION

> My concern is that our services are still not moving aggressively in wartime to provide resources needed now on the battlefield. I've been wrestling for months to get more intelligence, surveillance, and reconnaissance assets into the theater. Because people were stuck in old ways of doing business, it's been like pulling teeth.
>
> — Secretary of Defense Robert M. Gates, April 2008

In a 2008 speech to Air War College and Air Command and Staff College students at Maxwell Air Force Base, Secretary of Defense Gates delivered the Air Force a direct challenge to change its mindset from traditional operations and seek new irregular warfare support methods.[1] At the time, the Air Force was operating 23 medium-altitude unmanned aerial system combat air patrols; however, aggressive service-level efforts added eleven patrols within twelve months with a forecasted increase to 50 by fiscal year 2011. Additionally, the Secretary's intelligence, surveillance and reconnaissance (ISR) task force prompted the Air Force to acquire 37 modified C-12 aircraft to increase full motion video and signals intelligence (SIGINT) in Iraq and Afghanistan, demonstrating the insatiable need for ISR in counterinsurgency operations.[2]

While these initiatives are impressive and greatly beneficial to the overall effort in Operations Iraqi Freedom and Enduring Freedom, their numbers pale in comparison to that of non-ISR aircraft operating in the Central Command area of responsibility on a given day. Approximately 240 post-flight mission reports (MISREPs) from Air Force, Navy, Army, Marine Corps, and Coalition aircraft are processed daily by the Air Forces Central (AFCENT) Combined Air and Space Operations Center (CAOC).[3] Common intelligence collection means for these sorties include full motion video-capable targeting

pods, direct visual observation, and radar warning receivers, whose capabilities provide technical equivalence with traditional ISR platforms. These MISREPs follow well-defined format and content requirements stipulated by the Combined Force Air and Space Component Commander (CFACC), highlighting detailed information regarding battle damage assessment (BDA), air and surface threats to air operations, suspicious ground activity, electromagnetic interference, and overall effectiveness at tasked-mission accomplishment.[4]

This thesis seeks to determine what modifications, if any, should be made to the CFACC's mission reporting standards and processes that would result in mission reporting capable of satisfying information requirements (IRs) for the joint force at the tactical, operational, and strategic levels of operations. It will discuss the purposes and value of combat mission reporting to joint forces, particularly with respect to non-traditional ISR (NTISR). Additionally, an examination of reporting requirements will seek to derive supporting elements of information while exploring the potential of combat mission reporting to satisfy requirements within each level of operations. The thesis will then detail the CFACC's existing mission reporting process and discuss whether changes in reporting timelines, types of data collected, and means to disseminate information could increase the value of mission reporting. Finally, the thesis will discuss if it is advisable to change air reporting from a mission-centric process where all events are debriefed and reported at once, to an event-driven process where critical mission events are reported and disseminated immediately after occurrence, followed by event updates once a face-to-face debrief has been conducted.

Background

While the MISREP as a product continues to evolve in accordance with mission requirements of each theater and conflict, the basic concepts of mission reporting from tactical aircraft are little changed since 1918. As outlined in several bulletins issued by General Headquarters American Expeditionary Forces during World War I and codified in the War Department's *Intelligence Regulations* published in 1920, intelligence personnel assigned to aviation units prepare aircrew with an understanding of what type of enemy observations should be reported, then conduct a face-to-face debriefing and transmit findings to higher headquarters for synthesis and analysis.[5] Mission reporting requirements continued to evolve throughout World War II, resulting in a variety of reports with unique formatting and timeliness requirements to document engagements with enemy fighter aircraft, collect vital combat details from bomber missions, and report other indications of enemy activity.[6] The data collected was used by intelligence and operations planners at higher headquarters to determine restrike requirements, evaluate combat effectiveness, and assess enemy capabilities, tactics, and intent. As air operations evolved in Vietnam, and coalition operations in Operation Desert Storm, Kosovo, and Bosnia, the MISREP continued to serve as the primary tool to pass critical mission data from flying squadrons to air planners and intelligence analysts.

Traditionally, raw MISREPs were maintained exclusively at the CAOC or equivalent headquarters element and held as internal documents so that information could be carefully vetted prior to release in official assessments. In 2007, the AFCENT CAOC began working with the Air Force Research Laboratory to produce the MISREP Analysis Tool (MAT), which pioneered the use of MISREP data by anyone with access to the

Secure Internet Protocol Routing Network (SIPRNET).[7] MISREP focus had shifted from planning and assessment to tactical event reporting due to the lack of a credible air threat in Iraq and Afghanistan and, consequently, the MAT team was able to put potentially life-saving information collected from daily sorties directly into the hands of war fighters and planners with minimal filtering from headquarters elements.

Unfortunately, changes in handling MISREP data have yet to translate into a quick and effective information dissemination means. Currently, MISREPs still require a face-to-face debriefing between the aircrew and assigned intelligence support personnel, resulting in a mission reporting timeline largely unchanged in 92 years. Requirements vary by theater, but generally the intelligence specialist has three hours following mission completion or two hours following the end of the aircrew debrief to draft the MISREP. The MISREP is sent to the parent wing's combat intelligence center for quality control and formatting checks before transmission to the ISR Division (ISRD) Unit Support team at the CAOC. Unit Support performs additional quality control checks, determines if the MISREP requires changes to threat assessments within the theater, and posts the MISREP into a database for potential future analysis. Detailed reporting can take six or as much as twelve hours to get from combat aircraft to air planners, other aircrew members, and ground commanders using this process depending on the length of the mission.

Primary and Secondary Research Questions

What modifications, if any, should be made to the CFACC's aircraft mission reporting standards and processes to rapidly and effectively satisfy IRs for the joint force throughout the spectrum of operations? Secondary questions are:

1. Why is post-mission aircraft reporting from tactical aircraft necessary? What are the abilities and limitations of tactical aircraft to provide useable information? How can aircraft reporting be of value at the tactical, operational, and strategic level of operations?

2. What strategic, operational, and tactical questions are suitable for tactical airpower to address? How do information requirements for tactical aircraft change from major combat operations (MCO) to counterinsurgency (COIN) operations? What essential elements of information are required to satisfy information requirements?

3. What is the current state of the CFACC's MISREP process? What are the agencies responsible for coordinating and communicating the collection and dissemination of information? How is information regarding time-sensitive and routine events passed to various points of analysis?

Limitations

This thesis has two significant limitations. First, the need to ensure widest possible dissemination requires unclassified publication without caveats limiting distribution for official use only. Restricting the level of classification will limit the amount of discussion of certain facets of mission reporting, particularly linking specific aircraft types to mission performance. While individual MISREPs are generally classified, the mission reporting process and resulting systematic issues are unclassified.

Second, mission reporting requirements vary slightly for each combatant command based on operational requirements. Since MISREPs are still based on the United States Message Text Format, differences in reporting from one theater to another tend to be minor. Generally, variations between theaters revolve around the amount time

allowed to author the report and the format of specific fields within the message. For purposes of simplification, this thesis will reference the Central Command Area of Responsibility unless specifically noted.

Scope and Delimitations

This study will limit discussion to the conventional mission reporting process employed by non-ISR combat missions such as fighters, bombers, and cargo aircraft for two reasons. First, the ability of ISR aircraft to provide direct support to ground forces is generally well understood and has been thoroughly documented in academic, government, and professional publications. Second, reporting processes used by ISR aircraft vary significantly between platforms and theaters; attempting to document and analyze each process is worth further study, but not suitable for a single thesis.

Significance of Thesis

Since 2001, the air component has averaged more than 300 sorties per day in support of operations in Iraq and Afghanistan, resulting in 10,000 or more documented mission events per month.[8] These reports have the potential to add depth and clarity of information for air, ground, and maritime commanders, resulting in a more complete picture of the operational environment. While other studies have been authored regarding availability and formatting of MISREP data for use by air forces, none have been identified that discuss whether tactical mission reporting from combat aircraft has the potential to provide substantial benefits to joint forces, particularly the land component.

Recent studies have asked how the reporting quality could be improved and information could be communicated more effectively. This thesis will seek to determine

how combat air reporting could be leveraged for maximum benefit, and what changes need to be incorporated so that available reporting assets can be focused for utility beyond the air component. This chapter identified the background and scope of the reporting process employed by the CFACC and introduce key facets that will be explored throughout the thesis. To put the primary and secondary research questions posed by this thesis in context, chapter 2 will introduce relevant literature that describes the evolution of aircraft reporting, discusses its role in contemporary operations, and describes existing challenges. Grounded in an understanding of this literature, subsequent chapters will outline a framework for analysis and explore the research questions presented in this chapter in more detail to produce a series of conclusions and recommendations.

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[1]Robert Gates, Secretary of Defense, Speech delivered to Air University, 21 April 2008, http://www.defense.gov/transcripts/transcript.aspx?transcriptid=4214 (accessed 7 December 2009).

[2]Robert Gates, Secretary of Defense, Speech delivered to Air University, 15 April 2009, http://www.defense.gov/transcripts/transcript.aspx?transcriptid=4403 (accessed 7 December 2009).

[3]Air Forces Central, AFCENT MISREP Analysis Tool Web Site, AFCENT SIPRNET Page, http://my.afcent.af.smil.mil (accessed 6 November 2009).

[4]Air Forces Central, *AFCENT Intelligence Reporting Directive* (Shaw AFB, SC: Directorate of Intelligence, 2009), 11-14.

[5]Kenneth E. Hamburger, *Learning Lessons in the American Expeditionary Forces* (Carlisle Barracks, PA., United States Army Center of Military History, 2003), 20-21.

[6]Headquarters Army Air Forces, *Handbook for Combat Air Intelligence Officers* (Harrisburg, PA: Army Air forces Air Intelligence School, 1944), 35-40.

[7]Jeffrey D Schnakenberg, "MISREP Conference Notes" (547th Intelligence Squadron Conference, 26-27 October 2009, Nellis AFB, NV), 3.

[8]Gates, 21 April 2008.

CHAPTER 2

LITERATURE REVIEW

> The goal of our ISR efforts is to create an ISR enterprise where the source is transparent, analysis is predictive and distribution is immediate. Integration of efforts across the entire AF ISR enterprise is key to accomplishing that goal.[1]
>
> — Lt Gen David Deptula,
> USAF Deputy Chief of Staff for ISR, December 2009

This chapter is organized into four sections to highlight the evolution and current state of combat aircraft reporting. The first section discusses relevant orders in World War I, the interwar period, and World War II that initiated and formalized aircraft tactical reporting standards. The next two sections introduce doctrine and procedural guidance that is used in the current operational environment to set MISREP requirements and collect mission-related intelligence. The final section will address academic studies that directly discuss the reporting process or have significant impact to the process.

Historical Regulations

While it would be difficult, if not impossible, to identify the origins of tactical reporting designed to produce actionable intelligence, the use of aircraft reporting as an intelligence tool can be traced to three key orders issued by General Headquarters, American Expeditionary Forces during World War I. *General Order 21*, issued 13 August 1917, required seven department chiefs, including the Air Service, to designate an officer for each department to manage collection and dissemination of military information, identify errors made, and prevent reoccurrence.[2]

Issued on 20 December of the same year, *General Order 79* advocated a "close and intimate liaison" between operations and intelligence sections, and required brigade

and higher commanders to submit operations reports daily and following engagements to the Chief Intelligence Officer. The order dictated specific report items such as hostile situation, enemy movement, friendly action taken, and results of friendly and enemy action. In addition to the daily periodic report, it described a situation report format to immediately convey essential information regarding the commander's estimate of the enemy's condition.[3]

General Order 196, published 4 November 1918, continued to refine earlier orders by defining three classes of operation reports based on events and importance. Periodic reports were issued daily to capture routine events for mission planners, situation reports were submitted via most expedient means to transmit urgent or fleeting information, and special reports were generated at the conclusion of a series of operations. Content and handling instructions were identified for each form of operation report to clarify responsibilities and means of transmission to ensure timeliness of information.[4]

Lessons learned by American forces were published in the 1920 comprehensive set *Intelligence Regulations*. Of particular importance to this thesis, an entire chapter was devoted to intelligence work with the Air Service. Within it, the branch intelligence officer was identified as the individual to "assist the personnel of the air service in matters that pertain to intelligence" by collecting aerial observations, ensuring rapid dissemination of intelligence, and supporting the intelligence requirements of his assigned unit.[5] With respect to intelligence collection requirements, the following information categories were identified as most needed to support the army and corps: movements and activities in back and flank areas, rear lines of defense, hostile front lines,

and artillery positions.[6] Branch intelligence officers were responsible for conducting interviews with observers, identifying relevance, and disseminating information according to importance to army or corps headquarters. Recognizing the importance of lateral coordination, the regulations also placed importance on direct communication with other air units, in apparent response to the limitations of hierarchical reporting systems and the urgent need for rapid reporting of hostile activity. In addition to listing broad classes of information requirements similar to priority intelligence requirements (PIRs) used in contemporary operations, the regulation identified key components for select intelligence priorities. These components were equivalent to today's essential elements of information, such as time, location, direction, and composition of enemy rail activity. Finally, templates for observer, patrol, and intelligence summary reports were provided to standardize collection and prevent omission of key data.

By World War II, doctrine and theory pertaining to aviation employment had evolved significantly, meriting independent guidance apart from other combat branches. Published on 20 April 1942, Army Air Force Field Manual (FM) 1-20, *Tactics and Technique of Air Reconnaissance and Observation* codified instruction on the employment of reconnaissance and observer support aircraft. Along with techniques to operate according to environmental and threat conditions, the manual prescribed procedures for tailored air observation in support of air attack, mobile artillery, coastal artillery, cavalry, and armored forces. The manual's focus was observation and those units specially organized, trained, and equipped for air reconnaissance, but included mention of the ability for combat aviation assets to conduct reconnaissance as a secondary mission. While it maintained that speed and range gave all aircraft an inherent

ability to collect vital information, those advantages were tempered by the limited freedom of action required to provide formation security, air cover, and massed firepower.[7] As a result, FM 1-20 clearly stated that the ideal air platforms for tactical reconnaissance and observation were able to operate singly or in pairs, preserving the ability to maneuver in effort to execute search patterns and avoid enemy threats.

Lessons learned throughout the war pertaining to the integration of intelligence and air power built on initial guidance set forth in the 1940 Air Corps FM 1-40, *Intelligence Procedure in Aviation Units*. Highlighting this evolution is the second edition of the *Handbook for Combat Air Intelligence Officers*, produced in 1944 by the Army Air Forces Air Intelligence School. The handbook dedicated chapters to intelligence staff functions, administration, knowledge of enemy and friendly capabilities, and a variety of procedures. Additionally, the manual directly addressed the utility of aircraft-derived reporting:

> Through aerial photographs, visual observation and combat contact, precise data can be secured on the strength and disposition of enemy air, ground and naval forces, installations, defenses and weapons. From these same sources can be gained indications of enemy morale and discipline, and detailed information regarding enemy industrial production and transportation facilities. Information obtained by modern aerial methods, supplementing that acquired from ground reconnaissance, wireless interception, prisoner of war interrogation, espionage, technical air intelligence, etc. has provided invaluable knowledge of enemy air and ground capabilities.[8]

The school stated that air intelligence can be strategic--assessing the enemy's disposition, strength, and intent for campaign planning at higher echelons, or tactical--concerned with capabilities, tactics, and enemy defensive priorities for combat units. Combat intelligence was defined as a form of intelligence "derived from combat contact with, and reconnaissance of, the enemy."[9]

The process of intelligence personnel debriefing their assigned aircrew to initiate the reporting process, described as "interrogation" in this manual, is discussed in its own chapter. Detailed guidance includes diagrams of preferred interrogation room setup, various forms and checklists that should be used to support the process, successful techniques for relating with aircrew members following the stresses of combat, and guidance for what constitutes "Flash" news that should be reported before continuing the remainder of the interrogation.[10]

Within the *Handbook for Combat Air Intelligence Officers*, a separate chapter on reporting describes fifteen different types of reports applicable to air intelligence, to include requirements of timeliness, format, receiving office, purpose, and what types of events trigger report generation. Following a typical mission, as crew members egress the aircraft and process into the interrogation room, they would walk pass an analyst and phone to pass urgent Flash reporting such as friendly aircraft lost at sea or observed enemy tank movements. After all crews in a formation completed their verbal debrief with the Intelligence (S-2) section using a comprehensive report form, the air intelligence officer initiated a telephone report to higher headquarters following a prescribed checklist. Once interrogation results were correlated, the S-2 section drafted a written mission report to record detailed mission results, while documenting encounters with enemy aircraft in a separate combat report. Intelligence not initially forwarded in the mission or combat reports would be transmitted via a periodic report. Additional report types were used for historical studies, claiming combat kills, documenting enemy tactics through an operation, and other purposes.

Doctrine

The MISREP, also known as Joint Tactical Air Reconnaissance/Surveillance Mission Report, is defined in Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms* as:

> A preliminary report of information from tactical reconnaissance aircrews rendered by designated debriefing personnel immediately after landing and dispatched prior to compilation of the initial photo interpretation report. It provides a summary of the route conditions, observations, and aircrew actions and identifies sensor products.

Throughout joint doctrine, the MISREP is addressed primarily as a means to provide BDA. According to JP 2-0, *Joint Intelligence*, "MISREPs are used in most aspects of combat assessment, since they typically offer specific, quantitative data or a direct observation of an event to determine accomplishment of tactical tasks."[11] JP 3-60, *Joint Targeting* further associates aircraft mission reporting with BDA, but does not provide any guidance for format, timeliness, or content requirements.[12] The January 2010 version of JP 3-30, *Command and Control for Joint Air Operations*, has removed specific discussion of MISREPs and includes the term only as a tool used in the joint air tasking cycle. Most importantly, none of the joint publications referenced above mention what types of aircraft or missions are required to produce a MISREP.

The most thorough accounting of these reports in joint doctrine can be found in the *Commander's Handbook for Joint Battle Damage Assessment*, published by the United States Joint Forces Command Joint Warfighting Center, which states:

> The MISREP provides timely mission results and non-imagery recorded sightings. Information for this message is obtained from post-flight debriefings and may amplify the INFLTREP. The MISREP is sent to the tasking agency, the requesting unit or agency, and other interested organizations in the joint task force.[13]

The handbook continues that MISREPs constitute a key component of Phase I of the BDA process: physical damage assessment. While the MISREP does not generally satisfy requirements for physical damage by itself, it is an excellent means to determine if the target was struck or account for likely causes of mission failure. Generally, these results are combined with weapon system video, ground observation, additional imagery intelligence (IMINT) sources, SIGINT, or human intelligence (HUMINT) when available to determine if the target was successfully damaged or destroyed. While imagery is the preferred means to verify a successful strike, the requirement to issue a Phase I BDA report within two hours of MISREP receipt can limit initial reporting to a single source.[14]

The handbook does not limit the passing of critical information to MISREPs alone, but also includes a discussion of the use of inflight reports (INFLTREPs) as a means to transmit information of tactical value en route or at the target. The INFLTREP is a voice message issued by aircrew to the controlling element when the urgency of the information precludes time delay.[15] Those initial reports are then amplified and expanded during the mission debrief and included as part of the MISREP.

Rather than expand on the function and uses of inflight or post-mission reporting, Air Force doctrine continues to focus on the MISREP as a tool in the targeting process. The only specific mention of MISREPs in operational service doctrine is contained in Air Force Doctrine Document 2-1.9, *Targeting*, which restates the MISREP's role in BDA, but adds the remark that physical damage assessment is a function of the ISRD, with input from the combat operations division.

Army doctrine does not contain any mention of MISREPs, and the term is not defined in FM 1-02, *Operational Terms and Graphics*, but tactical reporting is still

understood as a critical combat task. FM 2-91.6, *Soldier Surveillance and Reconnaissance: Fundamentals of Tactical Information Collection,* identifies levels of reporting to prioritize and collect intelligence for enhanced understanding of the threat, terrain, and civil environment.[16] Beyond identifying categories of tactical reporting, the FM identifies potential visual indicators that can be observed by ground or airborne means. Relative to aircraft reporting, special note is made regarding its ability to determine enemy capabilities and courses of action due to its stand-off capability and on-board surveillance systems to locate and track targets.[17]

Additional guidance for operations and intelligence reporting, documented in each combat aviation brigade's tactical standard operating procedures, varies by unit based on mission, area of responsibility, and higher headquarters guidance. An in-depth review of procedures for each brigade is beyond the scope of this thesis, but the template provided by the US Army Aviation Center of Excellence at Fort Rucker identifies 40 unique types of tactical reporting applicable to Army aviation, including battle damage assessment, early warning of enemy aircraft and missiles, enemy contact and loss or damage of friendly aircraft.[18]

Marine Corps Warfighting Publication (MCWP) 3-26, *Air Reconnaissance*, offers perhaps the most thorough discussion of tactical aircraft reporting in current doctrine. The document includes air reconnaissance as one of six functional areas of Marine aviation, alongside antiair warfare, offensive air support, assault support, electronic warfare, and control of aircraft and missiles to contribute to command and control, maneuver, fires, logistics, and force protection.[19] MCWP 3-26 delineates categories of air reconnaissance as visual, imagery, and electronic, and proposes specific uses of air

reconnaissance for strategic, operational, and tactical levels of operations, all of which will be discussed in detail in chapter 4.

Procedural Guidance

While nominally a component of doctrine, this thesis examines procedural guidance as a separate extension that provides direction to implement doctrine, assigning specific roles and responsibilities. Of direct interest are documents pertaining to predictive battlespace awareness and the Theater Air Control System, each providing a unique set of information to guide the use of mission reporting.

Air Force Pamphlet 14-122, *Predictive Battlespace Awareness: ISR Employment*, defines NTISR as "the ability to capture information of intelligence value although that is not the platform's primary mission".[20] A complementary publication, Air Force Pamphlet 14-121, *Predictive Battlespace Awareness: ISR Strategy and Planning*, details guidance for the employment of tactical aircraft NTISR to increase the service's overall intelligence collection capability. As a function of advanced technical capabilities on modern fighter and bomber aircraft, aircraft have the ability to act as gap-fillers, collecting technical data and human observations in a secondary role to their primary combat mission. While collection can occur during any phase of flight and should not be unnecessarily limited, the pamphlet advocates pre-mission planning at the tactical and operational levels to identify expected or potential targets of interest within the planned operating or target area. Significantly, guidance places an emphasis on detecting time-sensitive targets incidental to the route of flight, rather than operating solely with the intent of searching for collection opportunities as a traditional ISR platform would.

While both pamphlets provide a level of insight to the capabilities of tactical aircraft to contribute to intelligence collection efforts via radar, infrared, electro-optical, and signals detection means, they fail to provide authoritative guidance as to the ways used to connect planning to execution. The CAOC is referenced as the primary agency to coordinate traditional ISR aircraft and assess performance, but an equivalent entity is not identified to execute the same tasks for NTISR. Both documents reference the ability of non-traditional collection sources to identify targets and facilitate their prosecution, but neither includes any guidance to utilize capabilities for long-term analysis and situational understanding.

The Theater Air Control System, as described in Air Force Policy Directive 13-1, provides the CFACC with a means to plan and conduct air operations within a theater and facilitate Air Force doctrine of centralized control and decentralized execution.[21] The directive identifies the CAOC, Air Support Operations Center (ASOC), Control and Reporting Center (CRC), and airborne command and control elements, each governed in detail by supporting instructions which detail functional requirements, key processes, manning, duty positions, and relationships with other organizations internal and external to the system.

As the senior Theater Air Control System element, the CAOC uses Combined Force Commander (CFC) and CFACC guidance to develop the Joint Air Operations Plan, allocate resources, and task forces. Air Force Instruction 13-1AOC Vol. 3, *Operational Procedures–Air and Space Operations Center*, describes a system that is normally charged with creating and managing plans for air tasking, air defense, and airspace control. As depicted in figure 1, the modern CAOC consists of five divisions with

multiple support and specialty teams. The Strategy Division is responsible for leading deliberate and crisis action planning for the CFACC and producing the Air Operations Directive to initiate and synchronize the air tasking process.[22] As the CFACC's element to enable long range strategy, it also leads operational assessment to determine effectiveness and efficiency of air operations towards component and joint objectives.

The Combat Plans Division reconciles the CFC's air apportionment guidance with available forces to develop an execution plan, conveyed as the air tasking order (ATO) and supported by targeting lists and the master air attack plan.[23] Once the ATO is undergoing execution, the Combat Operations Division assumes responsibility for maintaining situational awareness and coordinating with other Air Force command and control elements in response to dynamic changes. Within combat operations, major subordinate teams include offensive and defensive operations, intelligence asset management, and network interface control, along with liaison officers from other components and services. In response to battlefield changes, the division adds, deletes, or retasks sorties to meet tactical and operational requirements. Separate from combat operations, the Air Mobility Division plans, coordinates, tasks, and executes theater air mobility requirements, coordinating closely with the Director of Mobility Forces to manage intra-theater airlift, air refueling, and aeromedical evacuation.[24]

The CAOC's ISR Division provides actionable intelligence, battlespace awareness, and targeting support to allow the CFACC to anticipate future conditions, establish priorities, and exploit opportunities. Separate teams are used for collection management, analysis, intelligence dissemination, and targeting. Depending on theater requirements, additional teams may be established to support wing-level mission

planning and integration with national intelligence resources. Within the AFCENT CAOC, MISREPs are received, checked for accuracy, and analyzed for potential threats to air operations by the Unit Support team. Following inclusion into the MISREP database, reports may be accessed by the Targets team and Analysis, Correlation, and Fusion (ACF) team, among others. Data within the MISREP, such as time on station, munitions settings, and weather effects, may be utilized by other divisions and teams within the AOC, as will be discussed in chapter 4.

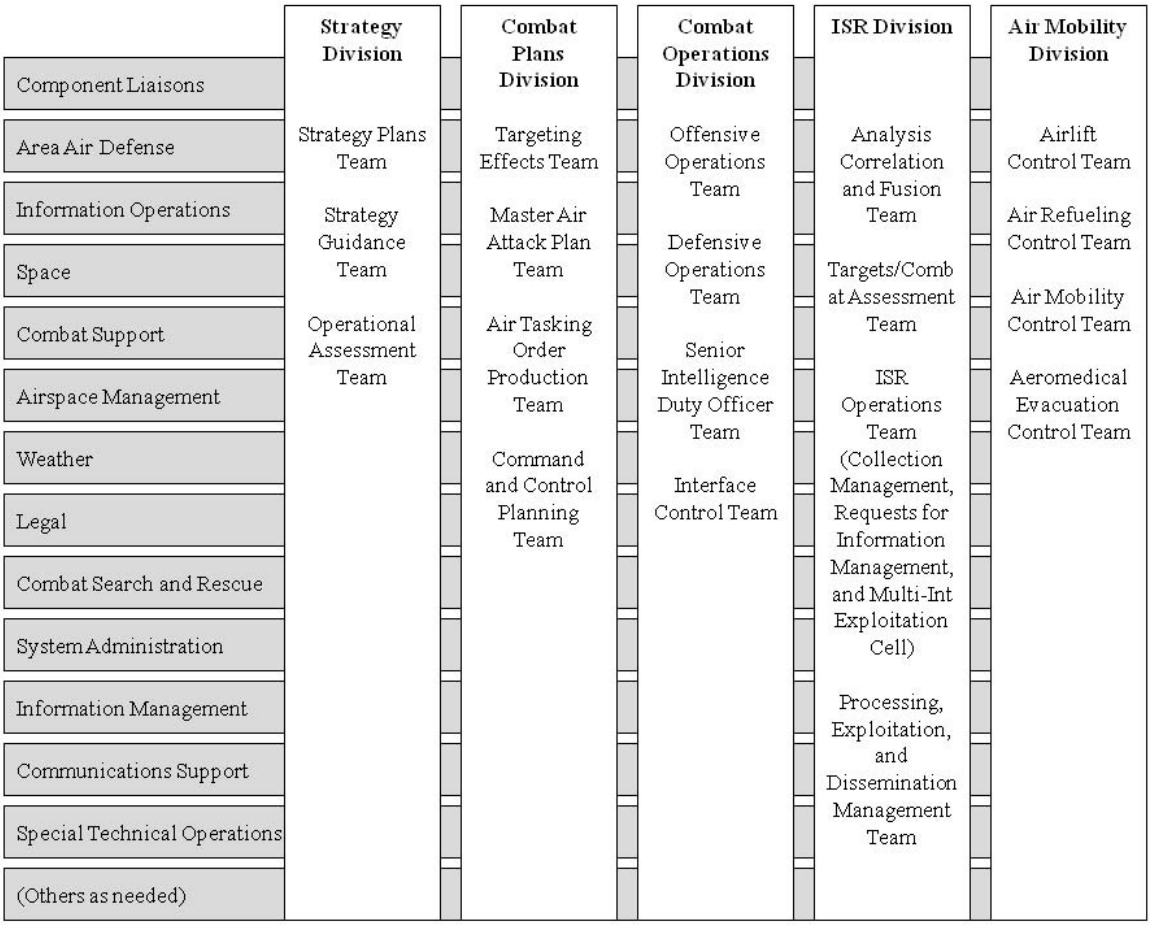


Figure 1. Air and Space Operations Center Organization

Source: U.S. Air Force, Air Force Instruction (AFI) 13-1AOC Vol 3, *Operational Procedures--Air and Space Operations Center* (Washington, DC: Government Printing Office, August 2005), 10.

Air Force Instruction 13-114 Vol. 3, *Air Support Operations Center Operations Procedures,* describes the Air Force's primary agency for enabling close coordination of air operations short of the fire support coordination line, often for direct support of ground operations. Directly subordinate to the CAOC, the ASOC is functionally aligned with a Corps, and generally co-located with the Fires element.[25] Tactical air control parties are aligned with maneuver elements down to the battalion level to advise ground units regarding the employment of air power, coordinate requests for air support, and provide terminal attack guidance for close air support missions. Intelligence personnel within the ASOC maintain ties to CAOC and Army intelligence staffs to ensure situational awareness within the ASOC, and coordinate with wing operations centers and aircraft controllers for mission planning support. The instruction concludes that ASOC intelligence personnel should assist in the production of essential elements of information in the Special Instructions portion of the ATO.[26]

Aircraft not under positive control of the ASOC to conduct air-to-ground operations are monitored by Control and Reporting Centers (CRCs), following guidance in Air Force Instruction 13-1CRC Vol. 3, *Operating Procedures--Control and Reporting Center*. The CRC may be fixed or mobile to facilitate air defense, offensive air operations, and airspace control. The number, location, and mobility of the CRCs are predicated by theater requirements, however the core missions of battle management, early warning, fighter control, and airspace management are enduring. Battle management command and control consists of managing the execution of tasks according to the ATO and disseminating changes as appropriate to ensure actions directed by the CAOC are executed. CRCs use organic and networked sensors alongside those of

controlled aircraft to detect, classify, identify, and track airborne objects. As hostile targets are identified, weapons control constitutes the tasking of counter-air, interdiction, refueling, search and rescue, close air support, electronic warfare, ISR, and other assets as needed to counter threats.[27]

Theater guidance for mission reporting is dictated in the Special Instructions portion of the ATO and Theater Intelligence Reporting Directive (IRD). In addition to prescribing detailed planning guidance for airspace control, personnel recovery, rules of engagement, and other items of interest, the Special Instructions identify inflight reporting standards, to include format, content, and handling instructions when an INFLTREP is received. The IRD provides a theater-specific template for post-mission reporting to unit-level intelligence personnel responsible for completing MISREPs. The CFACC may tailor the IRD according to theater requirements, but deviations from the United States Message Text Format for MISREPs identified in Military Standard 6040 are limited. The MISREP format identified in the IRD includes standard requirements to identify the mission, operation, weather, mission timing, equipment and software used, and other administrative information regardless of events observed during the sortie. Additionally, the IRD prescribes 20 or more distinct event entry types such as surface-to-air fire (SAFIRE), enemy intercept, target identification, and electronic support measures to record key mission data. When an event is recorded in the MISREP, the author completes a data entry line according to the IRD format requirement for that event, then provides a free-text amplification entry to repeat the entry in plain English and capture details not included in the data line. Event lines are added as needed to capture all relevant mission data, then the entire mission is reconstructed, time permitting, in a

narrative section at the end of the MISREP. Figure 2 demonstrates a sample MISREP; actual reports often exceed three pages.

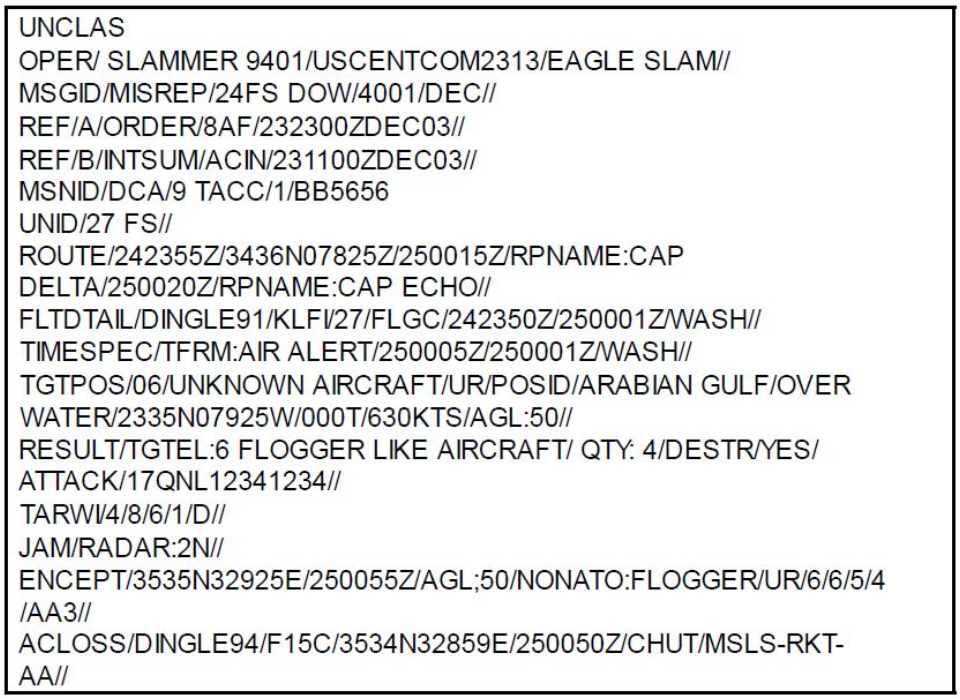

UNCLAS
OPER/ SLAMMER 9401/USCENTCOM2313/EAGLE SLAM//
MSGID/MISREP/24FS DOW/4001/DEC//
REF/A/ORDER/8AF/232300ZDEC03//
REF/B/INTSUM/ACIN/231100ZDEC03//
MSNID/DCA/9 TACC/1/BB5656
UNID/27 FS//
ROUTE/242355Z/3436N07825Z/250015Z/RPNAME:CAP
DELTA/250020Z/RPNAME:CAP ECHO//
FLTDTAIL/DINGLE91/KLFI/27/FLGC/242350Z/250001Z/WASH//
TIMESPEC/TFRM:AIR ALERT/250005Z/250001Z/WASH//
TGTPOS/06/UNKNOWN AIRCRAFT/UR/POSID/ARABIAN GULF/OVER
WATER/2335N07925W/000T/630KTS/AGL:50//
RESULT/TGTEL:6 FLOGGER LIKE AIRCRAFT/ QTY: 4/DESTR/YES/
ATTACK/17QNL12341234//
TARWI/4/8/6/1/D//
JAM/RADAR:2N//
ENCEPT/3535N32925E/250055Z/AGL;50/NONATO:FLOGGER/UR/6/6/5/4
/AA3//
ACLOSS/DINGLE94/F15C/3534N32859E/250050Z/CHUT/MSLS-RKT-
AA//

Figure 2. Example Mission Report
Source: U.S. Joint Forces Command Joint Warfighting Center, *Commander's Handbook for Joint Battle Damage Assessment* (Washington, DC: Government Printing Office, 2004), IV-4.

Academic Studies

Academic literature regarding combat aircraft reporting can be divided into two broad categories. A small number of works directly address the MISREP reporting process as the primary subject of study; each will be discussed in terms of key observations and recommendations. The second, larger group consists of studies that significantly reference mission reporting as part of a larger subject area or discuss

specific combat mission reporting requirements. To avoid redundancy and stay within the scope of the thesis, only the most significant works will be discussed.

In a 2003 thesis completed for the National Defense Intelligence College, Captain Derek T. Bright discussed the MISREP as a tactical tool to support friendly aircraft by identifying trends in enemy tactics and evaluate effectiveness of friendly tactics. His study, *The MISREP Process: The Search for Improved Combat Reporting*, described second- and third-order effects of post-mission reporting, such as resolving radar warning receiver anomalies, improving the development of aircraft defensive systems, and updating data on foreign weapon system capabilities as observed by aircrew. According to his analysis, the critical element of information collected in MISREPs is data related to SAFIRE events, "any type of enemy projectile whether it be a rocket, artillery round, bullet, missile, or flare that is fired into the air in a vertical type of trajectory with the assessed intent of attempting to shoot down a friendly aircraft."[28] After reviewing Operation Enduring Freedom MISREPs from October 2001 to March 2002, he concluded that the CFACC's existing MISREP program was ineffective at sharing critical threat information to operational and tactical planners. Bright advocated an overarching regulation and operating system to formalize reporting standards and ensure accessibility.

Major Aaron M. Prupas' 2004 Air Command and Staff College thesis *The Trouble with MISREPs, Improving Joint Air Combat Mission-Reporting Effectiveness* contends that MISREP data is not gathered, disseminated, or analyzed to effectively contribute to the BDA process. He defined post-mission combat reporting as "the first level of reporting done by the tactical level intelligence and operational personnel immediately following the combat mission,"[29] and detailed procedures and techniques

taught at intelligence technical training and the United States Air Force (USAF) Weapons School, which are further reinforced in the *Air Combat Command Intelligence Handbook*. His study described two major problems with the MISREP process. First, tactics, techniques, and procedures were not standardized throughout the USAF, which resulted in inconsistent reporting. Second, the reporting and databasing system used at the time was not sufficient to ensure information was available to commanders and mission planners, resulting in an inefficient combat assessment process. His assessment concluded that joint forces require a modern database to process and catalog MISREPs, along with a single USAF tactical doctrine document to standardize MISREP requirements.

Major Kevin S. Williams' 2007 research paper, *Expanding Emerging Non-Traditional ISR Collection and Network-Centric Warfare Capabilities: A Doctrinal Shift?,* advocated a change in the information reported rather than the process that disseminates and stores it, arguing that the NTISR capability well-known to fill gaps in imagery should be expanded to SIGINT. He contended that advanced processing in radar warning receivers and electronic warfare aircraft enables near-parity with traditional signals collection platforms to provide high-fidelity data for situational awareness and order of battle assessment.[30]

Captain John M. Minear's 2008 Weapons School paper, *Modernizing MISREPs: ISR Operations for the 21st Century*, noted that combat mission debriefing at the squadron level has not changed at a level commensurate with technology, citing methodological flaws that result in problems with timeliness, accuracy, and geolocational precision.[31] He identified the flying wing's senior intelligence officer as the primary

authority to ensure compliance with standards prescribed in the IRD, and remarked that those standards cause analysts to spend time collecting data and transcribing it into specific formats, limiting the opportunity for analysis by those most familiar with the mission.[32] In his words, "simply plugging in mandatory fields produced a meaningless report that doesn't help tactics developers or analysts. Without useable reporting, there was little purpose in reading MISREPs."[33] He recommended the Air Force digitize the process of pulling key data directly from the aircraft and combine the MISREP database with ISR collection data, culminating in a multi-classification database of high-fidelity data to enable accurate and timely analysis.[34]

Summary

As originally conceived, combat reporting from aircraft developed in parallel with that of other warfighting functions. Operations throughout World War I led to the realization that air reporting provided significant advantages in operational and tactical assessment and planning, leading to continued refinement in the interwar period. World War II saw development of robust reporting requirements designed to facilitate operational assessment at headquarters and tactical planning at combat units. Reviews of joint and service doctrine include sparse mention of aircraft reporting requirements and capabilities, but academic research and operational studies contend that demand for information provided by combat aircraft continues to be high. Chapter 3 of this thesis will outline the methodology and framework of analysis used for the remainder of this study. Later chapters will apply the literature to address whether the CFACC's procedures for collecting and disseminating mission-related intelligence are true to the system's original intent and sufficient to meet theater requirements.

[1]David A. Fulghum, "Fast Forward: Interview with Lt Gen David A. Deptula," *Defense Technology International* (December 2009): 47.

[2]U.S. Army, "Bulletins, G.H.Q., A.E.F," *United States Army in the World War: 1917-1919* (Washington, DC: Government Printing Office, 1948), 53.

[3]Ibid., 147-150.

[4]Ibid., 515-519.

[5]War Department, *Intelligence Regulations* (Washington, DC: Government Printing Office, March 1920), 82.

[6]Ibid., 84.

[7]War Department, Army Air Force Field Manual 1-20, *Tactics and Technique of Air Reconnaissance and Observation* (Washington, DC: Government Printing Office, April 1942), 3-8.

[8]Headquarters Army Air Forces, *Handbook for Combat Air Intelligence Officers* (Harrisburg, PA: Army Air Forces Air Intelligence School, 1944), 13.

[9]Ibid.

[10]Ibid., 31-42.

[11]Joint Chiefs of Staff, Joint Publication (JP) 2-0, *Joint Intelligence* (Washington, DC: Government Printing Office, June 2007), IV-19.

[12]Joint Chiefs of Staff, Joint Publication (JP) 3-60, *Joint Targeting* (Washington, DC: Government Printing Office, April 2007), C-8.

[13]U.S. Joint Forces Command Joint Warfighting Center, *Commander's Handbook for Joint Battle Damage Assessment* (Washington, DC: Government Printing Office, June 2004), IV-4 to IV-5.

[14]Ibid., IV-3.

[15]Ibid., A-7.

[16]U.S. Army, Field Manual (FM) 2-91.6, *Soldier Surveillance and Reconnaissance: Fundamentals of Tactical Information Collection* (Washington, DC: Government Printing Office, October 2007), 3-11 to 3-12.

[17]Ibid., E-1.

[18]U.S. Army Aviation Center of Excellence, Combat Aviation Brigade Tactical Standard Operating Procedures (Fort Rucker, AL, July 2007).

[19]U.S. Marine Corps, Marine Corps Warfighting Publication (MCWP) 3-26, *Air Reconnaissance* (Washington, DC: Government Printing Office, July 2003), 1-1.

[20]U.S. Air Force, Air Force Pamphlet (AFPAM) 14-122, *Predictive Battlespace Awareness: ISR Employment* (Washington, DC: Government Printing Office, March 2008), 10.

[21]U.S. Air Force, Air Force Policy Directive (AFPD) 13-1, *Theater Air Control System* (Washington, DC: Government Printing Office, May 1995), 1.

[22]U.S. Air Force, Air Force Instruction (AFI) 13-1AOC Vol 3, *Operational Procedures--Air and Space Operations Center* (Washington, DC: Government Printing Office, August 2005), 14.

[23]Ibid., 23-25.

[24]Ibid., 88.

[25]U.S. Air Force, Air Force Instruction (AFI) 13-114 Vol 3, *Air Support Operations Center (ASOC) Operations Procedures* (Washington, DC: Government Printing Office, June 2009), 5-6.

[26]Ibid., 8-9.

[27]U.S. Air Force, Air Force Instruction (AFI) 13-1CRC Vol 3, *Operating Procedure –Control and Reporting Center* (Washington, DC: Government Printing Office, January 2010), 12-13.

[28]Derek Bright, "The MISREP Process: The Search for Improved Combat Reporting" (Thesis, National Defense Intelligence College, 2003), 8-9.

[29]Aaron Prupas, "The Trouble With MISREPs: Improving Joint Air Combat Mission-Reporting Effectiveness" (Research paper, Air Command and Staff College, 2004), 4.

[30]Kevin Williams, "Expanding Emerging Non-Traditional ISR Collection and Network-Centric Warfare Capabilities: A Doctrinal Shift?" (Research paper, Air Command and Staff College, 2007), 5-6.

[31]John Minear, "Modernizing MISREPs: ISR Operations for the 21st Century" (Research paper, USAF Weapons School, 2008), 1.

[32]Ibid., 3-4.

[33]Ibid., 7.

[34]Ibid., 13-15.

CHAPTER 3

RESEARCH METHODOLOGY

The purpose of this thesis is to examine what modifications, if any, should be made to the CFACC's aircraft mission reporting standards and processes to rapidly and effectively to satisfy IRs for the joint force at the tactical, operational, and strategic levels of operations. In order to answer the primary research question, the thesis will examine the strengths and weaknesses of tactical aircraft reporting and how aircraft capabilities can simultaneously provide value along multiple warfighting levels. Additionally, reporting requirements will be explored to match technical capabilities against practical requirements. Finally, the thesis will examine the current state of the CFACC's mission reporting system during and following mission execution, along with the key facilitators used to drive the process, to determine whether or not the process is suitable to meet the requirements of the joint community. Research for this thesis will consist of a review of doctrine, procedural guidance directives, academic studies, and current literature. A series of fictional vignettes will be utilized throughout the analysis to demonstrate plausible examples of reporting scenarios.

Framework for Analysis

The first step in research for this thesis is to establish the potential of aircraft reporting to explain its significance to campaign and tactical planning. This baseline will present the strengths and limitations of tactical reporting relative to traditional ISR platforms and detail the means used for data collection. Identification of HUMINT, IMINT, SIGINT, and operational data and their overall impact will lead to a discussion of

how each may be used at the tactical, operational, and strategic level. Each level of activity will be described in depth to link reporting capabilities to real world use. Joint, Air Force, Marine Corps, and Army doctrine documents will be used along with service and theater procedural guidance to establish contemporary uses of the MISREP process. This step in analysis will conclude with a depiction that classifies air reporting by type and presents the overall joint contributions of air reporting of each type based on core reporting elements for each level of operations.

The second component of analysis will be an effort to identify strategic, operational, and tactical questions that tactical airpower is suited to answer. The thesis will explore doctrine and contemporary literature to identify common information requirements for the CFC, CFACC, and Combined Force Land Component Commander (CFLCC) based on the event types and purposes of reporting identified in preceding analysis. Reporting examples will be presented for MCO and COIN operations to derive common requirements for the successful flow of information. In effort to produce a single set of reporting requirements, the thesis will discuss information requirements in MCO and COIN environments, focusing on employment differences and the role of tactical reporting to support COIN operations. This section will conclude by synthesizing service doctrine, reporting guidance, and the author's analysis to link reporting requirements to information needs and broad purposes for three distinct event classes along each level of operations. Each reporting matrix will be presented to detail what is needed to support joint requirements.

Following an examination of the utility of aircraft reporting and what is needed to meet those requirements, the analysis will transition to how aircraft reporting is currently

executed. Research of current INFLTREP and MISREP procedures will leverage joint, Air Force, and Army instructions to determine the identity and role of key facilitators. As primary vehicles used to convey critical data, the INFLTREP and MISREP will be examined, to include purpose, format, handling procedures, and means of processing. Information dissemination will be presented, both as push and pull forms, discussing the use, strengths, and weaknesses of each system. To demonstrate the full reporting cycle, the thesis will utilize a reporting scenario from pre-mission planning, to event occurrence, and finally post-flight reporting. An overall summary will highlight specific portions of the existing reporting process that could result in a deviation from the intent and requirements of an effective mission reporting system.

Based upon these three approaches, the analysis presented in the next chapter will address the primary and secondary research questions of the study in detail. The thesis will conclude with recommendations in chapter 5 stating what changes, if any, should be made to combat mission reporting and how those changes should be implemented to support coherent and timely decision making for the joint warfighter.

CHAPTER 4

ANALYSIS

> The ordinary man is much more likely to do the right thing if he really understands why he is doing it, and what will probably happen if he does something else; and the best basis for sound judgment is a knowledge of what has been done in the past, and with what results.[1]
>
> — Air Marshal Sir John C. Slessor, Royal Air Force

This chapter will analyze the information gathered using the methodology presented in chapter 3 to recommend modifications to the CFACC's aircraft mission reporting process that will rapidly and effectively satisfy IRs for the joint force. This analysis will be divided into three sections: the value of tactical aircraft reporting, requirements for reporting to provide benefit to the joint community, and the present reporting process. By sequentially presenting needs, requirements, and method, the thesis will create a model to understand and assess the mission reporting process.

The Value of Air Reporting

The purpose of aircraft mission reporting is fundamentally no different than that of any other tactical mission: collect relevant data for analysis and assessment to produce situational awareness that leads to quicker decision making and ultimately situational understanding to improve the quality of those decisions. While aircrew use all five senses of soldiers on patrol, they lack the ability to interact with individuals on the battlefield. Instead, they compensate with sensors, range, freedom of maneuver, and the ability to find, fix, track, target, engage, and assess from a single platform. To appreciate the true value of aircraft reporting, it is necessary to understand its strengths and capabilities

balanced against inherent limitations, and framed in a context of tactical, operational, and strategic levels of operations.

Principles of Tactical Aircraft Reporting

JP 1-02 identifies several key terms to delineate joint requirements which will be used throughout this chapter. An IR is information "regarding the adversary and other relevant aspects of the operational environment that need to be collected and processed in order to meet the intelligence requirements of a commander."[2] Often written in the form of a question, a typical IR could be "What is the enemy's capability and intent to attack friendly forces along Route Aggies?" To utilize limited collection assets in the most efficient manner, focusing intelligence collection and analysis prevents overwhelming the commander with information. The most important IRs are designated as commander's critical information requirements (CCIRs) based on staff inputs and the commander's scheme of maneuver. CCIRs are "critical to facilitating timely decision-making", and may be categorized as either priority intelligence requirements (PIRs) or friendly force information requirements (FFIRs).[3] The IR above regarding Route Aggies would be selected by the commander as a CCIR if it would trigger key decisions such as the reallocation of forces or initiation of branches or sequels to the operations plan. Even if not selected as a CCIR, it still has merit for staff members and analysts to track in order to gain and maintain situation awareness, and could be designated as a CCIR at a later time.

Tactical air reconnaissance, as a primary or secondary mission to satisfy PIRs, is defined by JP 1-02 as:

> The use of air vehicles to obtain information concerning terrain, weather, and the disposition, composition, movement, installations, lines of communications, electronic and communication emissions of enemy forces. Also included are artillery and naval gunfire adjustment, and systematic and random observation of ground battle areas, targets, and/or sectors of airspace.[4]

Identified earlier in this thesis and based on the definition in Air force Pamphlet 14-122, the term NTISR is utilized to describe capturing information of intelligence value even though the aircraft has a different primary mission.[5] Whereas NTISR denotes the ability of aircraft without a traditional ISR mission to collect information about the enemy and the environment in support of PIRs, tactical air reconnaissance implies the additional collection of operations information to support FFIRs, giving the commander and staff details needed to "understand the adversary or the operational environment."[6] From a position of relative standoff, and aided with advanced sensors, aircraft can simultaneously observe the disposition of enemy and friendly forces, communicate directly as needed to clarify questions of status, and report changes in enemy activity, either due to adversary action against friendly forces or in reaction following engagement. For the purpose of this thesis, the term "tactical aircraft" refers to any fighter, bomber, mobility, special operations, or similar combat-coded aircraft that is not tasked for ISR collection as its primary mission.

This thesis does not contend that tactical aircraft should be considered better or worse than traditional ISR aircraft to collect needed information, but they are different, and bring advantages and disadvantages related to employment that must be understood. Major Kevin Williams' 2007 Air Command and Staff College research paper describes strengths of NTISR that include increased persistence, access to denied targets, and a

shortened kill chain.[7]. Slightly modified and expanded, those strengths could be restated as capacity, tactical flexibility, and increased survivability.

Capacity, or the "quality of quantity", allows persistence through the volume of aircraft with NTISR capability. According to an Air Forces Central 2003 report, the volume of sorties during the initial combat phase of Operation Iraqi Freedom heavily favored NTISR-capable combat aircraft such as fighters, bombers, and rescue over traditional ISR and command and control platforms. Not to be overlooked, airlift and refueling aircraft further contribute NTISR potential as will be discussed later in this chapter.

Table 1. CFACC Sorties Flown in Iraq: 19 March to 18 April 2003

Type	Number of Sorties
Fighters	20,228
Tankers	9,064
Airlift	7,676
Bombers	505
Rescue	191
ISR	1,656
Command and Control	1,061

Source: T. Michael Moseley, *Operation Iraqi Freedom: By the Numbers* (Shaw Air Force Base, SC: Assessment and Analysis Division, April 2003), 7-8.

While each individual F-16 or A-10 may only have a few hours of on-station time before it must return to base, refuel, or support another mission, a replacement can be sourced without the same level of difficulty of replacing one ISR asset with another because the overall availability is greater. That same volume translates to a shorter response time from other missions, airborne alert, or bases often located closer to ground

combat. Raw numbers of available aircraft further present an advantage of multiple options for ground forces: controllers have the possibility of considering targeting pod type, mission duration, crew composition, armament, and non-kinetic potential such as noise and size. Those options allow more freedom to select NTISR assets based on what is most appropriate, rather than what is readily available.

Tactical flexibility denotes the ability to operate with relative freedom of maneuver to counter threats while executing the mission in a dynamic environment. Due to sensor requirements, concurrent missions, risk mitigation, and safety of flight, ISR aircraft are often constrained to pre-determined orbits which limit collection opportunities. NTISR platforms, on the other hand, can be repositioned as needed and dedicated to support a single mission, resulting in a solution that can be easily modified as a situation unfolds. The lack of simultaneous missions to support also facilitates a less complicated tasking process where aircraft can be retasked and moved with less effort than high-demand, low-density ISR.

Relatively high speed and small size combine with armament and on-board defensive systems to increase survivability, which gains access to areas and targets that could be inaccessible to other aircraft due to enemy threat systems. Finally, many fighter and bomber aircraft possess imagery and detection capability in addition to air-to-surface munitions for a shortened kill chain. Rather than detect and identify a target, then source an asset to provide kinetic or non-kinetic effects, many NTISR aircraft can accomplish all on a single sortie, shortening the time required prosecute the target and reducing the likelihood of missing high-value or fleeting opportunities.

Limitations of tactical aircraft reporting, while not prohibitive, must be considered. Pertaining to collection of information to satisfy PIRs, the most important limitation is that NTISR is a secondary mission for tactical aircraft. Accordingly, proficiency in collecting information and assessing its value post-flight can be expected to vary from one airframe or squadron to another, and will be lower than that of dedicated ISR crews. Raw numbers of aircraft can enable increased total coverage for a given objective, but actual dwell time for each aircraft is often less, resulting in a certain loss of continuity, even if one aircraft is able to replace another. As with any other limited asset, tactical aircraft may be retasked to another mission, either expectedly or unexpectedly, in accordance with CFC priorities.

When using operational data to support FFIRs, consideration must be given to the subjective nature of aircrew observations. Distance from the point of observation makes identification of individuals and equipment difficult, and each MISREP or INFLIGHTEP is often based on a single individual making the best call from several miles away while flying at speeds that may exceed 400 nautical miles per hour. Coordinate accuracy can be high when precision devices such as targeting pods are used, limited primarily to the operator's ability to maintain the target designator on a specific position. Otherwise, geopositional data may be derived from geographic features or flight instruments that indicate the aircraft's position, potentially inducing unintended locational errors.

Regardless of whether collection is accomplished to support CCIRs or FFIRs, other significant limitations exist, notably the disparity of capability among aircraft, squadrons, and even aircrew. Where an F-15E may have a clear field of view and supporting systems that allow its targeting pod to slew onto the point of origin for a

SAFIRE event and derive precise coordinates with supporting full motion video for later analysis, a C-130 may only be able to give ordinal direction based an estimation of the aircraft's position. Within the same aircraft type, minor deviations in aircraft equipment, aircrew training, and operator experience can lead to differences in what is reported and the associated level of detail.

Means to Collect Information

Even though information collected by tactical aircraft is not limited to intelligence, the same disciplines of human, imagery, and signals can be used to differentiate capabilities. JP 1-02 characterizes HUMINT as that which is provided by human sources.[8] As such, aircrew observations that utilize judgment, experience, or personal observation, rather than a sensor, to capture details can be treated similarly to information resulting from an interview with a trustworthy HUMINT source. Unaided visual observation of enemy activity, such as size, activity, location, uniform, time, and equipment can be collected to varying degrees depending on visibility, distance from objective, and time available for observation. Actions taken by aircrew in response to hostile events or to correct equipment malfunctions would also be characterized as human-derived information. HUMINT reporting from aircraft has the potential to identify or amplify awareness of critical events, emerging threats, and decision points. For example, initial reporting of the success or failure to engage an enemy tank formation could prompt ground commanders to redirect forces, while observations of the defensive systems and tactics used by that tank formation while under attack would have value for CFACC mission planners.

IMINT, characterized by the collection, interpretation, and analysis of images recorded via electro-optical, infrared, and radar means, can refer to still or full-motion collection.[9] Targeting pods, forward looking infrared systems, and some aircraft radars can produce exploitable intelligence to support pre-operations surveillance and tactical overwatch during mission execution. Depending on equipment availability and collection platform utilized, IMINT may be disseminated inflight to remote video receivers, providing ground forces an expanded view of the operating environment. In addition to BDA following kinetic strikes or direct operations support, comparative analysis of imagery can be used to detect changes in areas or structures to support intelligence preparation of the battlefield. Rather than collecting a generic image, parameters such as look angle, altitude, resolution, field of view, and time of day can be adjusted to support requirements.

Signals collection, or that from communications, electronic, and instrumentation emissions, is performed by radar warning receivers, passive detection systems, electronic warfare sensors, and other low-density devices. To varying degrees, they permit the detection, classification, identification, and location of hostile electronic signals. Hostile radar activity such as aircraft intercept, target acquisition, target tracking, and missile guidance is analyzed by measuring signal characteristics to determine enemy capabilities, location, and intention. Communications intelligence, a subset of SIGINT, is not an organic capability for tactical aircraft, but valuable information can be gained by reporting meaconing, intrusion, jamming, and interference to report hostile and inadvertent friendly electronic interference or exploitation of voice and data systems.[10]

Missile warning systems that detect infrared and ultraviolet energy radiation to report potential anti-aircraft missiles defy easy characterization, but can probably be best described as measurement and signature intelligence, "derived from specific technical sensors for the purpose of identifying any distinctive features associated with the emitter or sender, and to facilitate subsequent identification".[11] Although the product of a technical system, these systems require human interaction to discern threat systems from false indicators resulting from environmental factors. In addition to reporting potential threats, reporting areas subject to false positives allows for improved situation awareness for aircraft, ultimately enabling freedom of navigation for joint aviation.

Uses at Tactical, Operational, and Strategic Levels

It is important to note that aircraft report details, often referred to as essential elements of information (EEIs). A single EEI response, like a single data point, may or may not have value by itself. Taken together, EEIs can provide information of value that provides context, clarity, and confirmation for other events or intelligence reports to satisfy PIRs.[12] Alternatively, a single EEI, such as enemy reaction following an operation against a high value individual or critical vulnerability, can simultaneously have value for multiple levels of war, and multiple components of the joint force.

The tactical level of operations encompasses the arrangement and maneuver of tactical units to plan and execute battles and engagements that support the attainment of military objectives.[13] Required activities consist of mission planning, threat assessment, and management of information during mission execution to maintain situation awareness of the disposition and intent of own, adjacent, and hostile forces. In reference to the type of information required to maintain situation awareness, Air Force Instruction

14-124 prescribes “greater level of detail over a smaller segment of the operational environment” to understand how the enemy fights, rather than limiting informational needs to where the enemy is located.[14] As depicted in table 2, MCWP 3-26 identifies several purposes of air reporting at the tactical level of war which serve as a starting point to discern the full joint contribution of CFACC mission reporting later in this chapter.

Table 2. Purposes of Air Reporting at the Tactical Level of War
1. Tactical threat warning
2. Mission planning
3. Targeting
4. Combat assessment
5. Threat assessment
6. Target imagery
7. Artillery and naval gunfire adjustment
8. Observation of ground battle areas, targets, or sections of airspace

Source: U.S. Marine Corps, Marine Corps Warfighting Publication (MCWP) 3-26, *Air Reconnaissance* (Washington, DC: Government Printing Office, July 2003), 1-3.

The examples listed above identify some of the practical uses at this level, but the fundamental principle is that accurate reporting with significant depth and detail over a narrow area of focus brings clarity to how the enemy is conducting operations. In addition to locating elements of enemy forces, air reporting for tactical units can provide status of battle positions, types of equipment in use, and details about how and when the enemy chooses to engage friendly forces. Rates of fire, engagement distance, caliber of weapons, and use of one weapons system to cue another are details presented by tactical aircraft that build robust situation awareness for air and ground forces, supporting a commander’s ability to make timely and informed decisions and guide staff planning.

The operational level of war links tactics and strategy by planning, conducting, and sustaining operations within a theater or other operational area.[15] In order to sequence and synchronize actions for a decisive time and place, breadth of information surpasses depth and detail to determine when and where the adversary will commit forces.[16] MCWP 3-26 again identifies potential uses of air reporting for joint forces:

Table 3. Purposes of Air Reporting at the Operational Level of War
1. Provide the intelligence information crucial to understanding a threat's weaknesses in order to develop friendly courses of action
2. Help define the critical vulnerabilities of a threat's national structure and military capabilities
3. Provide information on terrain; weather; and the threat's size, movement, and situation
4. Provide threat assessment
5. Identify targets

Source: U.S. Marine Corps, Marine Corps Warfighting Publication (MCWP) 3-26, *Air Reconnaissance* (Washington, DC: Government Printing Office, July 2003), 1-2.

Threat assessment remains a significant purpose, but is shifted in utility to support the arrangement of adequate forces to enable decisive operations, rather than prepare individual maneuver units for enemy tactics. Threat reporting at the tactical level can be combined with other sources at the operational level to ascertain the enemy's level of effort and intent along key areas. Careful analysis can evaluate friendly and enemy schemes of maneuver, leading to critical vulnerabilities and priority targets. Further, operational data from FFIRs can be used to determine mission and munitions effectiveness. Accumulated data is used to support decisions to add, move, or remove forces, adjust sortie apportionment, or change weapons allocation decisions.

The strategic level of war requires a mix of cumulative information and detailed clarity for select events to develop guidance, assess risks and synchronize national instruments of power.[17]

Table 4. Purposes of Air Reporting at the Strategic Level of War
1. Locate threat centers of gravity and strategic targets
2. Warn of hostile intent and actions
3. Analyze threat deployment and employment
4. Assess damage to threat and friendly targets
5. Determine threat force structure
6. Identify the threat's electronic order of battle
7. Provide threat indications and warning

Source: U.S. Marine Corps, MCWP 3-26, *Air Reconnaissance* (Washington, DC: Government Printing Office, July 2003), 1-2.

In addition to the purposes listed in table 4, air reporting has two key functions to support strategic decision making. First, similar to the concept of the "strategic corporal," air power has the potential to conduct tactical action with long-term strategic effects. Inadvertent weapons employment on non-combatants, successful engagement of high value individuals, and destruction of key enemy facilities may cause commanders and national leaders to change engagement strategies and redirect efforts. Timely and accurate reporting of critical events enables coherent decisions to be made and executed before an adversary can attempt to mitigate or exploit its value. Second, aggregate reporting is used by intelligence analysts, procurement officials, senior leaders, and weapons system program offices to identify trends, opportunities, and limitations in combat capability. Improvements across the domains of doctrine, organization, training,

materiel, leadership, personnel, and facilities may be identified and executed among all joint components as a result of holistic analysis of mission reporting.

Based on a synthesis of material presented in the Literature Review, figure 3 depicts a characterization of overall joint contributions of air reporting to the joint force. Reporting elements, as previously stated, do not change for each level of operation, but vary according to the type of event observed. For the duration of this thesis, reportable events will be characterized as one of three types: operational, hostile, and all others.

Operational events refer to reporting that is directed by friendly forces according to the aircraft's tasked mission, giving the opportunity to consider named areas of interest (NAIs), partner units, and priorities of IRs. Operational event reporting focuses observation to specific, often pre-determined points. Mission tasking may be from pre-mission orders or in response to dynamic events such as troops in contact. In either case, the NAI is well defined and user requirements can generally be anticipated by aircrew. This category does not limit reports to lethal operations; non-kinetic events such as airlift, airdrop, and shows of force require similar levels of planning, integration, and detailed observation for proper execution and analysis.

The second category, hostile events, has similarity to operational event reporting in that it requires a narrow focus, but is substantially different because it is enemy-driven. Accordingly, reporting is reactive and fleeting, and uses of reports focuses on tactics, countertactics, and intelligence implications. Hostile event reporting includes SAFIREs, surface-to-surface fire, and indications of hostile enemy radar.

Reporting for all other events denotes observations that could indicate enemy action or mission impact, but the event's precise nature or intent of individuals observed

cannot be immediately determined. Generally a result of circumstance rather than planning, these reports result from observation of broad areas of ground, sea or air space to detect targets, hazards, and obstacles. While the immediate impact of all these reports cannot initially be determined by aircrew, timely observation, especially when combined with additional sources, provides commanders and forces an improved understanding of the environment they are operating within. Examples of non-operational, non-hostile events include uncharacteristic vehicular traffic, border crossings, personnel gatherings, roadway obstructions, and significant weather or environmental conditions.

Reporting Elements	Tactical	Operational	Strategic
Operational Events (results from tasked mission)			
• Report results of friendly force action • Provide data used for targeting	• Determine status of target or objective • Support decision to re-engage	• Identify operational targets • Validate and revise decision points • Determine critical vulnerabilities	• Locate centers of gravity and strategic targets • Assess damage to threat and friendly targets • Report critical events which could be exploited for enemy advantage
Hostile Events (overt indication of hostile activity and intent)			
• Report size, activity, location, and type of threat activity	• Imminent threat warning • Identify targets of opportunity • Local threat assessment	• Provide information on the threat's size, movement, and situation • Operational threat assessment	• Identify the enemy's order of battle and force structure • Provide threat indications and warning
All Others (unknown nature or intent)			
• Observation of ground battle areas, targets, or sections of airspace	• Identify hazards and obstacles to movement • Ensure detection in areas without significant ground presence	• Enable freedom of movement • Identify key terrain • Warn of territorial incursions	• Warn of hostile intent and actions • Locate centers of gravity and strategic targets
Reporting inputs determined by mission; use can span all levels of full spectrum operations	*Reporting facilitates situational awareness; leads to improved mission planning and tactical execution*	*Raw information analyzed and correlated to assess progress and support course of action selection*	*Critical warning, corroborating evidence, and context to amplify existing reporting*

Figure 3. Joint Contributions of Air Reporting

Source: Created by author

To illustrate the concepts introduced to this point, a fictional case will be used that draws on a potential event and presents possible implications. Following air-to-air refueling, an A-10C checks in with the Joint Terminal Attack Controller for a pre-planned mission to provide on-call close air support to an infantry company conducting a raid against an insurgent leader believed to be operating in the vicinity of Musa Qala within Afghanistan's Helmand province. While enroute to the objective, the lead pilot visually scans the road while his wingman uses a targeting pod with infrared capability to search for indicators of recently-buried improvised explosive devices. Once the A-10 flight is within a pre-determined distance from the objective, the pilots visually acquire friendly forces and the target house and begin to report nearby movement. Following the initial raid, the A-10s observe and report individuals fleeing the house, until the wingman observes a brief flash accompanied by a smoke trail indicating a man-portable surface-to-air missile. Although hit, the flight lead is able to control the aircraft and returns to base with his wingman. An INFLTREP is issued advising of the hostile event and the aircraft's status, while ground forces investigate the SAFIRE's reported point of origin. Inspection of the aircraft after landing reinforces the assessment of a man-portable air defense system (MANPADS) which was not detected by the aircraft's missile warning system.

While enroute to the objective area and scanning for explosive hazards, suspicious points would be classified as "other" events that posed a possible threat to friendly movement. Tactical units would utilize warnings to investigate or proceed with caution, while operational echelons attempt to determine the validity of observations and recommend changes to IED procedures. After arriving on scene, the A-10 flight

transitions to operational event reporting to support timely inflight reporting and accurate post-mission reporting and after action reports.

The MANPADS event triggers immediate warning to other aircraft flying in the vicinity. Ground forces receiving the inflight hostile warning are able to respond to suspected threats and become aware of an enemy capability not previously assessed to be present. Flying squadrons throughout Afghanistan update their individual threat assessments and review training standards and countertactics against MANPADS while maneuver unit intelligence sections examine existing reports and reevaluate previously discounted messages that referenced MANPADS. The CAOC performs follow-on assessment of the MISREP in conjunction with current intelligence reporting to revise existing threat assessments, adjust employment guidance, and modify CCIRs and collection strategy. Other operational centers use the threat event as a barometer to hypothesize adversary targeting priorities and seek to determine if the event is indicative of a change in strategy or capabilities, or demonstrative of the importance of the original raid's objective.

Analysis at the strategic level of operations begins with intelligence agencies such as the Missile and Space Intelligence Center, National Air and Space Intelligence Center, and Air Force Intelligence Analysis Agency to determine the specific type of MANPADS used and predict future activity. The AFCENT Tactics Analysis Team and its associated Tactics and Adversary Studies Element fuse tactical reporting with cryptologic data and expertise from operators and analysts to reconstruct the event and identify training opportunities.[18] Based on intelligence analysis, the program office for the A-10's defensive suite engages system contractors and engineers to determine possible causes

for the aircraft's missile warning system failure. Debris recovered from the missile's point of origin, made possible inflight and post-mission reporting, identifies the MANPADS as a new system previously unknown in Afghanistan that can be traced back to another country. With physical evidence in hand, strategic decision-makers are able to set policy based on a more accurate knowledge of trans-national implications.

Reporting Requirements

With an understanding of the potential value of air reporting, how it is distinguished from ISR reporting, and a model for how it can be classified by common purpose and effect, the next section will explore the elements required to maintain an effective reporting system. This section will present brief reporting examples for MCO and COIN to identify factors that enable successful reporting. Mindful of the factors that contribute to effective reporting, the thesis will discuss how reporting requirements and execution differ between MCO and COIN. This section concludes with a series of reporting requirements with IRs and EEIs for operational, hostile, and all other events to improve reporting clarity.

Reporting Examples

Mission reporting in traditional combat can range from simple to complex depending on the mission type, participants, and threat level. To demonstrate a robust MCO capability via an example most Airmen are familiar with, this section will use a combat search and rescue event. Immediately following an event that leads to the downed aircraft, the mishap aircraft, a wingman, or the controlling agency will report the cause of the event, last known location, and status of the aircrew involved.[19] While not overtly

stated, the status of isolated personnel and any threats to the survivor and recovery force become the initial CCIRs, while the last known location is understood as an NAI. The CAOC's Chief of Combat Operations consults with the Joint Personnel Recovery Center to begin building a recovery task force and identify ISR or NTISR assets capable of providing immediate support. The combat search and rescue task force is augmented with specialized support as needed depending on the threat level and assessed enemy forces. In addition to a recovery vehicle, on-scene commander, and airborne mission commander, aircraft provide suppression of enemy air defenses, interdiction, counter-air, electronic warfare, and recovery vehicle escort.[20] If necessary, the entire event can be accomplished without retasking any ISR events.

The process of reporting the initial event, integrating assets, communicating changes in the common threat picture, and coordinating efforts throughout execution is made possible by common awareness of procedures, participants, requirements. The scenario above describes 17 or more aircraft, of at least six different types, but each is familiar with the procedures outline in JP 3-50, *Personnel Recovery*, and common terminology in the Air Land Sea Application Center's *Multi-Service Brevity Codes* manual. Understanding a common procedure and using mutually understood terminology are the first enablers for a positive outcome; they establish a common frame of reference and mutual acceptance of responsibilities. Building on common procedures, each participant knows his or her role, capabilities, and limitations, along with those of the other members. Interaction among participants is controlled and moderated by a central figure to ensure communications are frequent, but focused and relevant. Finally, requirements are mutually understood. In this case, requirements are straightforward and

highlighted in the overall procedures: status and location of isolated personnel, threats to the survivor and recovery task force, enemy awareness of the ongoing operation, and changes in the event which could require further changes to force composition. The event described above equates to at least nine separate mission reports from 17 or more aircraft that are later analyzed, compared, and correlated to accurately reconstruct the event and derive lessons learned.

A COIN scenario may at first appear to be less complicated, but is no easier to successfully execute. To illustrate an example of ineffective reporting, an F-15E observes four vehicles parked outside a compound in Afghanistan's Parwan province. Although noticing the vehicles, the pilot and weapon systems officer decide not to report the observation since no overtly threatening behavior is observed and there are no attempts from vehicles or individuals to flee the vicinity. Unfortunately, the aircrew are unaware that the compound is an area of interest to the nearest maneuver battalion, and the unit's commander has a PIR concerning meetings at the compound and vehicles used for facilitation. Ultimately, an opportunity to satisfy the PIR and possibly exploit a high payoff target is lost because the participants were unaware of each other's procedures and requirements.

In the COIN scenario above, PIRs and NAIs for the ground unit were disconnected from the aircraft. While the F-15E's unit has a ground liaison officer (GLO) assigned, there is still a significant challenge of coordinating collection requirements to account for each echelon of the land component for the entire range that can be covered by the F-15E. If an incident is observed and reported, post-mission reporting will often have a delay of three or more hours after the mission has concluded, unless the aircrew

have established a pre-existing relationship with a specific unit to communicate inflight reporting standards. Assuming the S-2 is aware of the ability of CFACC assets to report valuable information and has access to SIPRNET, he or she must still take the time to search through an additional database and know what type of events to investigate.

Interconnectivity in a Reporting System

The examples presented above represent the highs and lows of interconnectivity between reporting elements and potential users of their information. Figure 3 represents interconnectivity as the degree of coordination between participants to produce an effective flow of information that is relevant, focused, and timely to support a user's requirements. Interconnectivity is not a line drawn from the reporting aircraft to a single user. Rather, it describes the relationships between a reporting entity and the multiple organizations it has the ability to support. Further, interconnectivity can vary from one type of event to the next. High interconnectivity is marked by a direct, and often habitual, relationship between organizations where requirements are mutually understood and members are able to coordinate to improve performance over time. A flying squadron's relationship to the CAOC, or when assigned as direct support to a ground unit, are examples of relationships with high interconnectivity.

Moderate interconnectivity is characterized by requirements passing from the user to the reporting element through a third party. Moderate interconnectivity denotes an awareness of the user by the reporting element, but not a firm ability to seek clarification and receive feedback to improve performance. Aircraft tasked to support ground units via Joint Tactical Air Support Requests would generally fall under this category unless specific circumstances or personalities drive a higher level of coordination.

Low interconnectivity indicates no coordination between participants, often through a lack of awareness of each other's need or capability. Reporting here can be characterized as "piggyback," where the aircraft reports based on the standards and requirements of its partners with higher degrees of interconnectivity. For example, the F-15E in the earlier COIN example would report based on guidance from the CAOC and its parent unit; other units would likely only receive information that fit within those standards.

Participants	Requirements
High Interconnectivity	
• Direct coordination between user and reporter • Mutual awareness of roles, capabilities, and limitations • Accessibility	• CCIRs and NAIs known in advance • Timeliness requirements understood and attainable • Product format and method of dissemination known
Moderate Interconnectivity	
• Coordination between user and reporter mediated by third party • Direct tasking not likely	• Common understanding of general reporting priorities • Areas of interest understood, but not named or annotated with PIRs • User requests may not be realistic
Low Interconnectivity	
• No coordination between user and reporter • No ability to provide feedback • Limited access to reporting • Minimal awareness of reporting capacity	• No communication of CCIRs or NAIs • "Piggyback" reporting • Latency of information negates potential

Figure 4. Degrees of Reporting Interconnectivity
Source: Created by author

While it is not practical to establish high or even moderate levels of interconnectivity for every potential customer, it is possible to modify normal reporting standards to provide information with more applicability to a wide audience of users. The

remainder of this section will explore operational considerations for COIN and MCO, then produce a supporting set of reporting requirements.

Operational Considerations

USAF doctrine identifies 17 operational functions performed by the service to support national objectives. Of these, tactical aircraft under the CFACC's control have the ability to perform strategic attack, air refueling, counterair, counterland, countersea, airlift, and combat search and rescue as primary missions. To a lesser extent, they can support special operations, information operations, navigation and positioning, command and control, surveillance and reconnaissance, and intelligence.[21] Throughout MCO, air forces perform the operational functions to directly or indirectly support physical and logical lines of operations envisioned by commanders to satisfy tactical, operational, and strategic objectives.[22] Reporting mission results allows for planning, execution, and assessment of air operations toward sustainment of these objectives.

COIN operations, centered on the human, rather than geographical terrain, reference logical lines of operations that require airpower as a supporting effort. FM 3-24, *Counterinsurgency*, identifies five common lines of operations which may be tailored according to the situation: Combat Operations and Civil Security Operations, Host Nation Security Forces, Essential Services, Governance, and Economic Development.[23] Within Combat Operations and Civil Security Operations, typical goals include securing the populace and securing national or regional borders.[24] Combined, these functions isolate the insurgency from the populace it seeks to control and sources of external support used to sustain operations. While tactical aircraft do not directly participate in efforts to build security forces, services, governance, or economic resources, they enable these efforts by

contributing to the establishment of a secure environment and allowing a portion of ground forces to focus on building capabilities over security tasks.

Beyond the role in which aircraft are applied, differences abound in COIN which change the employment and execution of tasks. MCO require a detailed process to prioritize targets and plan mission for efficient prosecution. Alternatively, COIN often involves more time to identify targets or wait for a situation to develop that will require on-call targeting and weapons employment, often against fleeting targets. Whereas an MCO interdiction mission may include flying to a designated area and destroying any observed enemy vehicles, a COIN close air support mission flown by the same aircraft can require aircraft to hold in reserve and respond to requests for fire from ground forces.

Overriding requirements to support the populace further drive a higher weight of effort to separate valid targets from non-combatants and change employment procedures and weapons to mitigate unnecessary damage. Mission reporting requirements for targeting in COIN can place as much effort on potential damage to civilians and property as the attainment of military objectives. While an MCO target nominated by the air component may not have direct impact to the ground component, a COIN target nominated by any one component can affect others, particularly the ground component, if it significantly influences the population.

Relative to MCO, COIN involves a significantly reduced threat level to aircraft, highlighted by a lower density of less capable threats which may include small arms, rocket propelled grenades, and limited stocks of MANPADS. Without the threat of enemy fighters and radar-directed surface-to-air missiles, aircraft are able to operate as independent flights instead as components of large packages. With air superiority, the

CFACC is able to focus energies on providing more direct capabilities rather than enabling functions such as counterair and suppression of enemy air defenses. Likewise with mission reporting, less effort may be placed to determine threats to air operations, in favor of reporting optimized to enable activities of the supported commander. In effect, the primary customer of air reporting in MCO may be the CFACC to establish air superiority and support the CFC's targeting priorities, but conditions in COIN permit the primary focus to shift to the ground component to facilitate a secure ground environment and attainment of further objectives.

Reporting Requirements by Event Class

Analysis to this point has focused on what tactical air reporting can provide, determining three classes of reporting and illustrating their use at multiple level of operations. The series of graphics to follow show how reporting can be executed to support requirements for each reporting type. Each table is organized with purpose, IRs, and supporting EEIs, creating a "build to" structure to support attainment of requirements and demonstrate the supporting nature of similar requirements among levels of operations. IRs account for the data required to make decisions and assess performance towards achieving objectives in accordance with Air Force Pamphlet 14-123, *Predictive Battlespace Awareness: Assessment*. EEIs provide aircrew and analysts increased awareness of what observations are required to prevent inadvertent loss of valuable data.

Operational event reporting provides focused reporting of key mission events from the aircraft's primary tasking. While taskings may be modified during mission execution, they are often known to some extent during planning, enabling opportunities to craft EEIs beyond those identified below. Reporting in this case is not only to report

the status of friendly force operations and determine re-engagement requirements, but also provide intelligence information, as enemy activity immediately following operational event reporting may assist in the determination of critical vulnerabilities and develop future targets for nomination.

Tactical	Operational	Strategic
Purpose		
• Determine status of target or objective • Support decision to re-engage	• Identify operational targets • Validate and revise decision points • Determine critical vulnerabilities	• Locate centers of gravity and strategic targets • Assess damage to threat and friendly targets • Report critical events which could be exploited for enemy advantage
Information Requirements		
• Was the intended action accomplished? • Was the intended direct effect accomplished? • Has the objective's status changed? • Is re-engagement necessary? • Was the effect accomplished within required time constraints?	• What effect did the action have on the enemy? • Did the action contribute to operational objectives? • Does component strategy or objectives need to be modified? • Does the friendly force structure or level of effort need to be modified?	• Does joint, national, or coalition strategy need to be modified? • Are actions of the air component integrated with the joint strategy? • Are there any suspected violations of the laws of armed conflict?
Essential Elements of Information		
• Initial observations and indications of mission results • Software or hardware failures that contributed to mission failure • Aircraft conditions at the point of weapons or cargo release • Weather considerations impacting mission success	• Enemy efforts to cover, conceal, or protect targets • Evidence of new or unusual activity at the objective • Enemy attempts to salvage resources or rebuild after an attack • Location of friendly and neutral elements in the vicinity • Associated threat events	• Loss of friendly forces or damage to equipment • Indications of civilian presence before, during, and after the intended action • Suspected loss of civilian lives or damage to property • Recurring equipment malfunctions inhibiting mission success

Figure 5. Requirements for Operational Event Reporting
Source: Created by author

Information requirements for hostile event reporting evolved from Captain Stephen Price's paper, "Five Questions for Better Threat Integration." Price argues that improved threat assessment is gained by asking the following five questions: "What is it?

How do we know it's there? What can it do to us? What can we do to prevent that? How does the threat country integrate this threat with others?"[25] This thesis expands those questions to capture the decisions friendly force commanders may be required to make in response to threat assessments. EEIs for hostile event reporting are designed to elicit a breadth of reporting to assess the impact of each threat in an area of operations.

Tactical	Operational	Strategic
Purpose		
• Imminent threat warning • Identify targets of opportunity • Local threat assessment	• Provide information on the threat's size, movement, and situation • Operational threat assessment	• Identify the enemy's order of battle and force structure • Provide threat indications and warning
Information Requirements		
• What is the threat? • How is it detected? • How does it affect tactical employment? • What counter-tactics are effective?	• Does the threat require changes to force disposition? • Are changes in operational planning or employment required? • What are the enemy's targeting priorities?	• To what extent does the enemy integrate threat systems and capabilities? • What DOTMLPF changes are required to counter the threat?
Essential Elements of Information		
• Friendly aircraft conditions at time of occurrence • Size, activity, location, and type of threat activity • Means used to detect and identify the threat • Tactics employed by the threat • Counter-tactics used by targeted aircraft and degree of effectiveness • Last known status of the threat	• Effectiveness of systems and procedures used to identify and detect the threat • Ability to discern enemy forces from friendly and neutral elements • Identification and involvement of friendly and neutral elements in the vicinity • Restrictions on self defense imposed by rules of engagement • Indicators used to identify enemy formation type, status, and intent	• Equipment vulnerabilities that cannot be mitigated by changes in tactics • Key indicators used to identify enemy formation type, echelon, designation, and intent • Changes in enemy threat systems or tactics • Electronic indications observed immediately before, during, and after the engagement • Loss of friendly forces or damage to equipment

Figure 6. Requirements for Hostile Reporting
Source: Created by author

To provide freedom of movement and ensure situational awareness over areas without significant ground presence, reporting for all other events seeks to identify hazards to movement, indications of potential threat activity, and cross-border movement.

Tactical	Operational	Strategic
Purpose		
• Identify hazards and obstacles to movement • Ensure detection in areas without significant ground presence	• Enable freedom of movement • Identify key terrain • Warn of territorial incursions	• Warn of hostile intent and actions • Locate centers of gravity and strategic targets
Information Requirements		
• Was the intended action accomplished? • Did the action reveal enemy activity? • Was the effect accomplished within required time constraints?	• How, when, and where are joint forces likely to encounter enemy activity? • How is the enemy conducting cross-border movement? • Does component strategy or objectives need to be modified? • Does the friendly force structure or level of effort need to be modified?	• What are the enemy's territorial objectives? • What are the enemy's targeting priorities? • Does joint, national, or coalition strategy need to be modified? • Are actions of the air component integrated with the joint strategy?
Essential Elements of Information		
• Suspected explosive hazards • Indications of man-made obstacles • Significant personnel and vehicular activity • Non-threatening enemy air, ground, and maritime movement • Sensor anomalies impacting mission execution • Weather considerations impacting mission success	• Enemy efforts to cover, conceal, or protect forces and their movement • Evidence of new or unusual activity or equipment • Non-threatening ELINT activity • Cross-border movement • Associated threat events	• Enemy efforts to mass forces • Enemy air, ground, and maritime activity indicating an alert or defensive posture • Recurring sensor malfunctions or anomalies inhibiting mission execution • Loss of friendly forces or damage to equipment

Figure 7. Requirements for All Other Reporting

Source: Created by author

Depending on the impact of a particular event in the battlespace, analysts and engineers at operational and strategic centers may require information used at the tactical level, necessitating transparent data handling to preserve original observations.

The Reporting Process

An ideal mission reporting system should balance the needs and abilities of a wide variety of users while rapidly communicating requirements, observations, and performance feedback in a transparent and uncomplicated manner. The final section of analysis will explore the air component's current mission reporting system to determine

adequacy and possible areas to improve. This section will begin with the agencies that facilitate reporting and means used to convey IRs, then review the entire process from event occurrence to product dissemination.

Facilitation of the Air and Space Operations Center

The CAOC plays a central role, not only as a user of reporting, but in planning and controlling air operations and requisite air reporting. As discussed in chapter 2 and shown in figure 1, the CAOC depends on five divisions to communicate requirements and results for effective control of CFACC assets. The Strategy Guidance team functions as a bridge between operational and tactical planning through production of the weekly Air Operations Directive to communicate the CFACC's intent, CCIRs, and prioritized operational and tactical objectives.[26] This level of planning covers a period of time from 24 hours to 10 days before execution, and provides overarching guidance for the Master Air Attack Plan team within the Plans Division to match resources against requirements. The Master Air Attack Plan presents the timed flow of resources to array a balanced set of capabilities in response to CFACC requirements and ground force requests for air support.[27] The ATO Production team then matches requirements against specific units. Additionally, aircraft configurations, airspace assignments, and controlling agencies are designated, and mission numbers are assigned to track each mission during and after execution.[28] The ATO, then, becomes the primary vehicle used to convey aircraft taskings down to individual wings and squadrons for detailed mission planning. Simultaneously, the Command and Control Plans team produces daily, weekly, and monthly Special Instructions to augment the ATO and provide detailed guidance for all facets of air employment, to include inflight reporting procedures.[29]

As the CAOC's focal point for real-time execution of combined air operations, the Combat Operations Division coordinates in real time with wing operations centers, ASOCs, and CRCs to maintain situation awareness and respond to battlefield dynamics, maintenance problems, and weather.[30] Combined with a common operations picture produced via electronic datalinks and internet chat inputs from theater agencies, inflight reporting drives mission execution. Accordingly, elements within subordinate offensive, defensive, and intelligence cells may direct ad-hoc reporting from aircraft beyond standards dictated in the Air Operations Directive, Special Instructions, or mission planning process to enable timely decision making.

While the Combat Operations Division is largely concerned with FFIR reporting, the ISRD devotes significant effort to PIRs to support its charge of providing predictive battlespace awareness.[31] The ACF team conducts all-source analysis of theater air, missile, space, and information warfare threats to support detailed tactical planning and provide aircrew an understanding of the current operating environment for accurate PIR reporting. The team provides a daily theater intelligence summary of air-centric intelligence for distribution in addition to daily briefings for the CFACC and CAOC staff to synchronize the current intelligence picture.[32] The Air Force National-Tactical Integration cell, either independently or as part of ACF, interfaces with the national intelligence community for planning, threat analysis, and targeting. Taken together, these elements have the ability to augment inflight reporting by providing context and clarity to missions in the execution and planning stages.

The Unit Support Team, doctrinally subordinate to ACF, but often separated as an independent ISRD element, functions as the primary intelligence conduit to the CFACC's

flying units and lead agency for analysis of threats to air operations. Unit Support receives and processes all CFACC MISREPs and contacts other components' air units to acquire non-CFACC MISREPs for inclusion into the air component's MISREP database. While Unit Support does not receive voice INFLTREPs from aircraft, it monitors internet chat rooms on SIPRNET for current reporting to provide ad-hoc threat assessments for time-sensitive target, troops-in-contact, and CSAR events. Post-mission aircraft reporting, with special emphasis on SAFIRE events, is captured in a daily review that is included in the ACF intelligence summary.[33]

Similar in concept to Unit Support, but focused exclusively on mobility aircraft, the Air Mobility Division's Mobility Support Team combines intelligence and force protection specialists to provide tailored support to mobility assets. The team coordinates with the ISRD via Unit Support to enable real-time ISR support for select missions. Beyond particular support requirements, mobility assets present two unique reporting capabilities: Combat Track II equipment modifications to provide an inflight reporting capability similar to internet chat, and Fly Away Security Teams to report ground conditions at austere or unsecured airfields.[34]

Three other teams within the ISRD serve as potential supporting elements to support IRs, refine EEIs, and enhance mission reporting. The ISR Operations team integrates the efforts of component collection managers, platform sensor liaisons, reconnaissance planners, and exploitation centers to execute the theater ISR plan.[35] The team manages taskings for traditional ISR platforms such as the U-2, RC-135 Rivet Joint, and RQ-4 Global Hawk, it receives NAIs and PIRs for select targets which are published in the Reconnaissance, Surveillance, and Target Acquisition Annex to the ATO.[36]

Requirements changes for dedicated ISR platforms are coordinated with the Combat Operations Division's Senior Intelligence Duty Officer team to balance dynamic events against pre-existing requirements, potentially requiring NTISR support. Working in partnership with ISR Operations and Combat Operations, the Targets team performs target system analysis to develop targets, assess collateral damage estimates, and recommend weaponeering solutions for pre-planned and time-sensitive situations.[37] Finally, the Imagery Support Element interfaces with individual customers and the Targets cell to provide imagery products from national, theater, and commercial sources.

Two elements within the CAOC perform feedback and assessment. The Strategy Division's Operational Assessment team manages overall evaluation of effectiveness and efficiency of air operations to determine overall achievement of operational objectives, primarily through quantitative analysis.[38] Within the ISRD, the Processing, Exploitation, and Dissemination cell performs quantitative and qualitative assessment for CFACC ISR. The cell uses internal ISR reporting data and interaction with theater ISR users to determine mission effectiveness and recommend adjustments to improve mission success.[39]

Coordinating and Communicating Requirements

Physically located within the CAOC, but operating under the Commander of Army Forces, the Battlefield Coordination Detachment (BCD) is integrated with the air component to facilitate battle command, intelligence, fires, airspace management, air defense, theater missile defense, command and control warfare, and airlift support.[40] Specific functions include "exchanging current intelligence and operational data, support requirements, coordinating the integration of Army forces requirements for airspace

coordinating measures, fire support coordination measures, and theater airlift."[41] Requests for air support, following prioritization by the CFLCC, are coordinated and monitored by the BCD, with particular attention paid to close air support, air interdiction, suppression of enemy air defenses, and ISR.[42] Figure 8 presents the BCD's organizational structure; elements are aligned to CAOC divisions and teams depending on functional requirements, with preference given to physical co-location when possible.

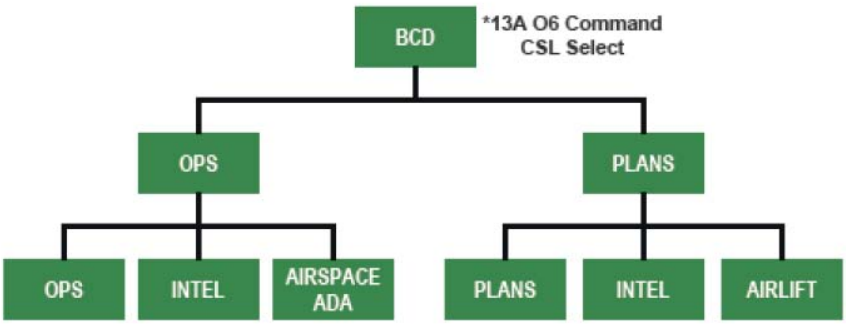


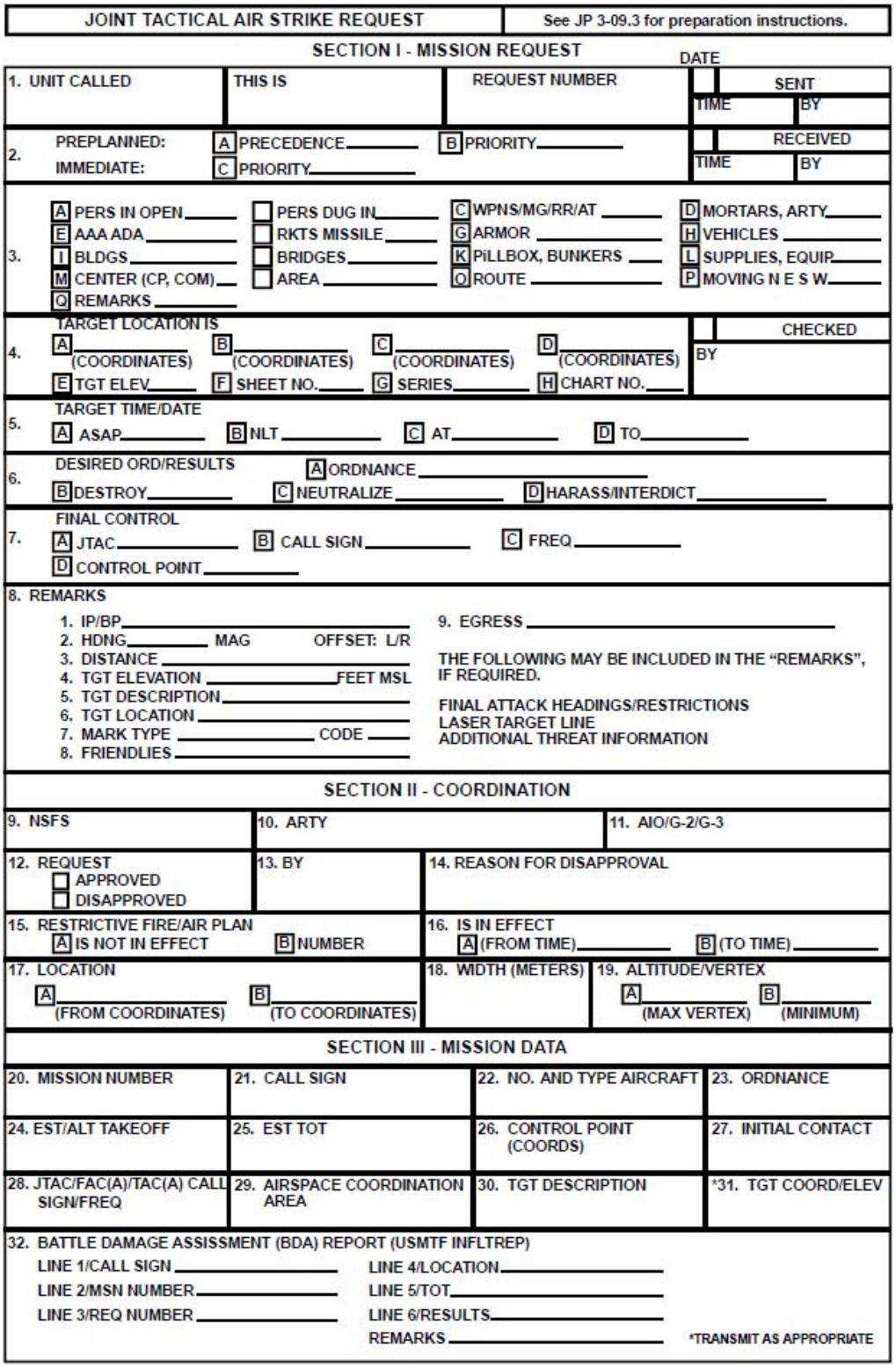
Figure 8. Battlefield Coordination Detachment Organization
Source: John Best, "Battlefield Coordination Detachment" (Research paper, Air Command and staff College, 2006), 4.

According to FM 100-13, the BCD articulates CCIRs for the Commander of Army Forces to the CFACC, but no mention is made for CCIRs of subordinate units.[43] The author has observed one case where the BCD solicited division and brigade-sized elements for NAIs to satisfy a particular tactical problem, but personal observation indicated this was an isolated occurrence based on non-doctrinal actions of proactive individuals.[44] Instead, the primary agent to facilitate passage of NAIs and CCIRs is the GLO, alternatively identified in procedural guidance as the Ground Liaison Detachment.

As defined in JP 1-02, the GLO receives specialized training in offensive air support, and is assigned to Air Force and Navy units at the wing and squadron level.[45] In the most basic sense, GLOs "translate ground commander air requests into a language coalition aircrews can understand" to ensure supporting aircraft understand the intent, requirements, and impact of air support requests.[46]

In addition to habitual relationships with ground units, GLOs receive guidance and taskings via operations orders and Joint Tactical Air Strike Request forms. Operations orders convey a commander's visualization of the battlespace, along with intent and scheme of maneuver to direct operations towards attainment of objectives.[47] Following a standard five-paragraph format outline in FM 5-0, CCIRs are located in paragraph three (Execution), within section J (Coordinating Instructions); reporting standards and methods are located in paragraph five (Command and Control).[48] If published, additional guidance may be found in Annex B (Intelligence), Annex C (Operations), Annex D (Fires), Annex L (ISR), and Annex R (Reports).[49]

Department of Defense form 1972, shown as figure 9, is used to communicate air support requests from ground units.



JOINT TACTICAL AIR STRIKE REQUEST — See JP 3-09.3 for preparation instructions.

SECTION I - MISSION REQUEST

DATE

1. UNIT CALLED | THIS IS | REQUEST NUMBER | SENT | TIME | BY

2. PREPLANNED: A PRECEDENCE ____ B PRIORITY ____ | RECEIVED | TIME | BY
IMMEDIATE: C PRIORITY ____

3. A PERS IN OPEN ____ | PERS DUG IN ____ | C WPNS/MG/RR/AT ____ | D MORTARS, ARTY ____
E AAA ADA ____ | RKTS MISSILE ____ | G ARMOR ____ | H VEHICLES ____
I BLDGS ____ | BRIDGES ____ | K PILLBOX, BUNKERS ____ | L SUPPLIES, EQUIP ____
M CENTER (CP, COM) ____ | AREA ____ | Q ROUTE ____ | P MOVING N E S W ____
Q REMARKS ____

4. TARGET LOCATION IS | CHECKED | BY
A ____ (COORDINATES) B ____ (COORDINATES) C ____ (COORDINATES) D ____ (COORDINATES)
E TGT ELEV ____ F SHEET NO. ____ G SERIES ____ H CHART NO. ____

5. TARGET TIME/DATE
A ASAP ____ B NLT ____ C AT ____ D TO ____

6. DESIRED ORD/RESULTS
A ORDNANCE ____
B DESTROY ____ C NEUTRALIZE ____ D HARASS/INTERDICT ____

7. FINAL CONTROL
A JTAC ____ B CALL SIGN ____ C FREQ ____
D CONTROL POINT ____

8. REMARKS
1. IP/BP ____
2. HDNG ____ MAG OFFSET: L/R
3. DISTANCE ____
4. TGT ELEVATION ____ FEET MSL
5. TGT DESCRIPTION ____
6. TGT LOCATION ____
7. MARK TYPE ____ CODE ____
8. FRIENDLIES ____

9. EGRESS ____

THE FOLLOWING MAY BE INCLUDED IN THE "REMARKS", IF REQUIRED.

FINAL ATTACK HEADINGS/RESTRICTIONS
LASER TARGET LINE
ADDITIONAL THREAT INFORMATION

SECTION II - COORDINATION

9. NSFS | 10. ARTY | 11. AIO/G-2/G-3

12. REQUEST ☐ APPROVED ☐ DISAPPROVED | 13. BY | 14. REASON FOR DISAPPROVAL

15. RESTRICTIVE FIRE/AIR PLAN A IS NOT IN EFFECT B NUMBER | 16. IS IN EFFECT A (FROM TIME) ____ B (TO TIME) ____

17. LOCATION A ____ (FROM COORDINATES) B ____ (TO COORDINATES) | 18. WIDTH (METERS) | 19. ALTITUDE/VERTEX A ____ (MAX VERTEX) B ____ (MINIMUM)

SECTION III - MISSION DATA

20. MISSION NUMBER	21. CALL SIGN	22. NO. AND TYPE AIRCRAFT	23. ORDNANCE
24. EST/ALT TAKEOFF	25. EST TOT	26. CONTROL POINT (COORDS)	27. INITIAL CONTACT
28. JTAC/FAC(A)/TAC(A) CALL SIGN/FREQ	29. AIRSPACE COORDINATION AREA	30. TGT DESCRIPTION	*31. TGT COORD/ELEV

32. BATTLE DAMAGE ASSISSMENT (BDA) REPORT (USMTF INFLTREP)
LINE 1/CALL SIGN ____ LINE 4/LOCATION ____
LINE 2/MSN NUMBER ____ LINE 5/TOT ____
LINE 3/REQ NUMBER ____ LINE 6/RESULTS ____
REMARKS ____ *TRANSMIT AS APPROPRIATE

Figure 9. Department of Defense Form 1972: Joint Tactical Air Strike Request
Source: Joint Chiefs of Staff, Joint Publication (JP) 3-09.3, *Close Air Support* (Washington, DC: Government Printing Office, July 2009), A-6.

As air support requests are prioritized at higher echelons, processed at the CAOC, and tasked via ATO, GLOs begin the process of delineating specific requirements and preparing aircrew. Although the form is listed with the title Joint Tactical Air Strike Request, it is used for tactical air support requirements that may not necessarily require kinetic effects. The form includes a rough description of the target and remarks for pilots to include for mission planning, but has no ability to communicate specific IRs or EEIs other than two brief entries for results and remarks from the aircrew for inflight reporting.

Standardization among BCDs and GLOs is performed by the Army Joint Support Team. As an enabling organization, the team supports joint air-ground operations integration at the tactical level by partnering with the 57th Operations Group at Nellis Air Force Base, Nevada; integration at the operational level is accomplished by coordinating with the 505th Command and Control Wing at Hurlburt Field, Florida. In addition to coordinating joint exercises, the team supports multiple formal training courses and provides mobile training teams to prepare deploying forces.[50]

Mission Execution

Mission planning timelines and products vary by platform, operation, and mission requirements. However, close interaction between intelligence and operations planners at the wing and squadron mission planning cells, aided by a GLO, if available, provides tactical aircrews with critical information regarding the friendly and enemy situation, mission objectives, procedural instructions, and reporting criteria. Instructions tailored for each weapons system require intelligence personnel to brief EEI and mission debriefing requirements prior to each mission. Immediately before crews depart for the mission, the

intelligence section provides a final briefing to note changes in the battlespace and highlight critical information.

Following an event with tactical significance or urgency that would no longer be useful if reporting was delayed until post-flight, an INFLTREP is transmitted by voice to the aircraft's controlling agency using the format in figure 10.[51]

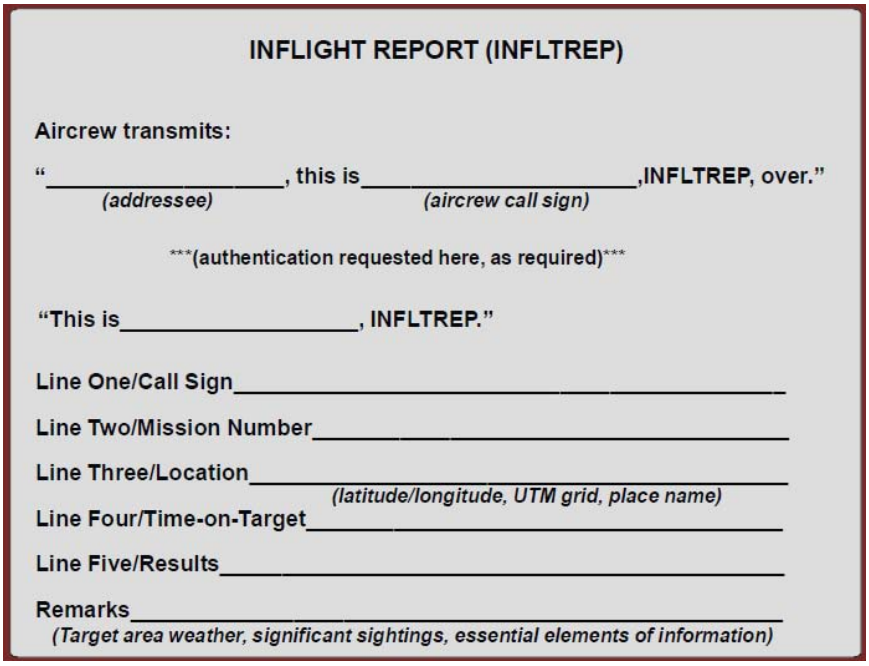


Figure 10. Inflight Report Format
Source: Joint Chiefs of Staff, Joint Publication (JP) 3-09.3, *Close Air Support* (Washington, DC: Government Printing Office, July 2009), V-46.

Determination of whether to send an INFLTREP is ultimately based on operator judgment, facilitated by thorough mission planning and coordination with the supported unit. Common events that are reported include SAFIREs that require aggressive maneuvering to avoid, electronic indications of imminent hostile activity, and BDA results following kinetic strikes.[52] Aircrew may use any means to pass INFLTREPs to

their controlling agency, but normal dissemination is made through a dedicated ultra-high frequency voice network.[53] If the aircraft is being controlled by an airborne asset such as the E-3 Airborne Warning and Control System or E-8 Joint Surveillance and Target Attack Radar System, over-the-air warnings are propagated as necessary by voice, and the message must be forwarded to a ground-based agency, typically the ASOC, for reporting via SIPRNET. Ground-based agencies, however, are able to receive INFLTREPs and immediately forward information to a wide audience using internet chat tools on SIPRNET.

Although unit-level intelligence personnel may be actively monitoring SIPRNET chat for inflight reporting, chat reports frequently limit reporting to salient details, rather than the full report issued during the mission. Resultantly, it is incumbent on aircrew during the debriefing to self-identify INFLTREPs that were issued during flight so that the intelligence section may provide detailed amplifying information in the MISREP for subsequent analysis. The intelligence analyst receiving the mission debrief is responsible for completing the MISREP to convey intelligence and operational information, even though he or she may not have been present for mission planning. As discussed in chapters 1 and 2, the analyst generally has three hours following aircraft landing before the final MISREP must be received at the CAOC. To save time and allow for more detailed analysis, intelligence personnel will often fill out administrative entries while waiting for the mission to return and use a "reporting shell" with common event entries listed in United States Message Text Format. For example, a standard HH-60 MISREP shell may contain pre-formatted line for SAFIRE, rescue, and missile warning entries; lines not used are deleted during the writing process. Once complete, the MISREP is sent

to the wing combat intelligence center for quality checks, then finally to the Unit Support team at the CAOC for analysis and database entry.

The text-based word document described above has historically been the primary means for transmitting MISREPs, but is not the only option available. Low-density reporting tools such as Air Mobility Command's Web Debriefer and Air Combat Command's Automated MISREP Tool may be used by select squadrons, but the primary alternative is the Air Force Research Laboratory's MAT, discussed in chapter 1. Although referenced as one system, MAT consists of two parts. A web-based data entry page allows users to log in via password and enter data in a menu-driven, plain text format; and a database of existing MISREPs can be accessed by anyone on SIPRNET to retrieve data. MAT uses extensible markup language to ingest MISREPs from a variety of systems, but Unit Support analysts must still conduct a manual review for conversion errors and seek information from units if the MISREP generation tool used prohibits full compliance with guidance in the IRD.

Compilation of MISREPs is further complicated if the reporting aircraft is not under CFACC control. Army, Marine Corps, and select special operations aircraft, not bound by the IRD, are free to report post mission reporting in any format that suits their requirements, frequently including Microsoft Excel spreadsheet, PowerPoint storyboard, or unformatted narrative text.

Product Dissemination

Dissemination of aircraft mission reporting can be described as dual push and pull systems. To push information to users, INFLTREPs, once received from aircraft during mission execution, are pushed out in a blind manner, meaning that the controllers

entering the information have no ability to actively monitor who has received the information. After MISREPs have been received at the CAOC, the Unit Support team emails a daily summary following an internal distribution list of units currently in theater or with an expressed interest in the reporting. If a report meets specific criteria, available information is emailed as a special report as soon as it is known, and follow-up assessments are issued as required. Especially critical reports are issued as Pilot Update Codes, requiring unit-level action to confirm receipt and update mission planning materials.

The ability to push information provides a low-effort means for receivers to access reports, but does not guarantee that the right information is getting to the right users. When a single file is sent to helicopter, fighter, and cargo squadrons operating at highly diverse airspeeds and altitudes, there is little ability to appropriately tailor the assessment for maximum benefit. Further, distribution lists for an entire theater become difficult to manage and offer no guarantee of contact as units rotate in and out of theater at irregular intervals. Rather than producing a single file on a single network with a single distribution list, updates must be reproduced for different classified networks to accommodate multinational participants not able to access SIPRNET.

Conversely, the ability to pull information requires active involvement from individual users rather than the CAOC. Facilitated by MAT, anyone with SIPRNET access is able to access the entire MISREP database, whether located in the area of operations or not. Limited attempts have been made to incorporate some amount of MAT reporting into other threat-related databases, but research has not indicated full integration. Without full interoperability with other reporting databases such as the

CFLCC's Combined Information Data Network Exchange, MAT represents an extra step for analysts to check, and one that may easily be unknown or overlooked by planners who are unaware of the benefits of air reporting. Analysts accessing the MAT database must manually screen their search results to account for reports that may have been reported elsewhere so that an event is not reported twice, indicating a threat level higher than reality. Although MAT accounts for the most thorough inventory of aircraft reporting, it is limited to text information only, and does not include imagery, video, or associated reports that can augment and amplify the raw MISREP. MAT further requires users to know how to properly filter and interpret reports, which can present problems when the IRD prescribes more than 20 unique data entry types. Finally, unless the MAT server is duplicated onto multiple secure networks, its data is inaccessible to users not operating on SIPRNET.

Summary

This chapter has presented reporting from tactical aircraft as an enabler to facilitate the passage of vital information pertaining to operations and enemy activity allowing commanders, operators, and analysts to rapidly make informed decisions. Aircraft, regardless of mission type, have the potential to report the results of their operations in real time and provide vital information to reduce the fog of war, if information is made available to users in a timely manner.

This chapter presented three categories of air reporting with corresponding purposes and common reporting elements to compensate for scenarios with low interconnectivity between aircraft and other joint warfighters. In the current environment, however, the CFACC can utilize more than 20 unique reporting entries, each with its own

format and required EEIs. Moreover, no standard exists to unify reporting from tactical aircraft to a common purpose with easily understood requirements. Despite the best of intentions, available capabilities cannot be fully exploited unless collectors understand the purpose of their actions, and users understand the value and limitations of potential sources.

Adhering to the reporting purposes and principles identified in this chapter could bring improvements in scenarios of low interconnectivity when collectors and users are unable to interact, but it is necessary to act in a manner that would increase interconnectivity as a whole when possible. Information requirements for the senior Army commander are coordinated by the BCD, but communication of requirements at lower levels for subordinate commanders must be facilitated by individual GLOs at the wing and squadron level. This results in a system that may be highly successful in one area, but less capable in others.

The CAOC offers significant potential to focus and amplify tactical reporting, but its organizations are primarily concerned with exploiting reports to support their own requirements, rather than producing an informational common operating picture that incorporates tactical reconnaissance in real time. Chat tools facilitate a partial awareness of ongoing activity, but individual reporting elements are not linked together or tied to the final MISREP to allow full situation awareness and depth of analysis.

Without a coherent strategy to communicate information requirements and synchronize combat mission reporting, the joint warfighter will receive an irregular flow of information at irregular intervals. Chapter 5 will address each of these observations, recommend potential solutions, and advocate further areas of study beyond the scope of

this thesis to further enhance situational understanding and increase effectiveness of the joint force.

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CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

As a system that is little changed since inception in World War I, aircraft mission reporting still accomplishes its primary purpose of recording and communicating valuable information to support decision makers and planners. However, incremental modifications, while adding precision and increasing availability of information, have culminated in a process driven by and for CFACC benefit – not a true joint effort. If operational reporting and NTISR can be integrated into joint planning and execution, commanders will be able to make more timely and informed decisions, and dedicated ISR platforms can be optimized for greater efficiency and effectiveness.

Establishing Joint Unity of Effort

Before procedural or technical changes can be enacted to facilitate an integrated reporting system, it is necessary to establish and communicate the joint purposes of tactical air reporting to incorporate the perspectives and requirements of producers and users. Air reporting, in its current state, consists of disparate elements reporting what they believe to be important information, without complete knowledge of its full purposes. Since reporting aircrews are naturally air-minded individuals, the system tends to bias toward air-centric requirements, specifically hostile events which could affect aircraft. Simultaneously, many potential customers are unable to utilize this resource to its full potential due to a lack of awareness and understanding. As with many problems involving a disconnect between elements, substantial ground can be gained through education.

The joint purposes of air reporting, associated reporting elements, and degrees of interconnectivity advocated in figures 3 through 7 should form a baseline for continued education of joint warfighters. The Army Joint Support Team, through interaction with the 57th Operations Group and 505th Command and Control Wing, is the ideal organization to advocate requirements for the land component and ensure pre-deployment training standardizes understanding and actions of BCDs and GLOs. Its USAF counterparts at Nellis and Hurlburt should incorporate complementary training objectives tailored to reporting and facilitating elements at the tactical and operational level.

Increasing Interconnectivity

With common purpose and requirements established, efforts should turn to increasing interconnectivity between air and ground units, specifically to communicate requirements at the brigade level and below. The BCD has established procedures to ensure CFLCC CCIRs are addressed, but little data exists to indicate that subordinate requirements are communicated in a unified or coherent manner, even with the substantial efforts of GLOs. Without a means to coordinate requirements for maneuver units to reporting elements, the resulting system continues to be inconsistent. Just as the CFC has a lead element to prioritize and coordinate ISR requirements, a lead organization should be established within a theater to ensure CCIRs and NAIs for all levels of the joint community are known in advance.

The CAOC, as the CFACC's agency charged to facilitate centralized control and decentralized execution, is the ideal location to centralize requirements for air reporting. The BCD, Navy, and Special Operations liaison elements should interface with their respective components to maintain a current inventory of CCIRs, NAIs, points of contact,

and means to communicate inflight. If possible, a graphic or common operational picture overlay should be maintained to display the ground footprint of land-owning units. This toll would allow aircrew to attempt pre-mission contact once their route of flight is known, improving ad-hoc collection while en-route to other objectives. Due to the potentially high workload of the BCD to coordinate this requirement, associated ASOC, fires, and intelligence elements at the corps level and below should be incorporated as partners to facilitate the passage and consolidation of information. As a further supporting element, Department of Defense form 1972, used to request air support, should be modified to include the requestor's NAIs and corresponding information requirements.

As requirements are received by component liaisons, the Unit Support team should review inputs for suitability, request clarification as needed, and produce mission planning documents for implementation at the wing and squadron level. When possible, efforts should be directed to disseminate information in a transparent format that can be readily used by aircrews, such as an ESRI shape file with NAIs labeled and a corresponding text file to denote IRs. Because NTISR is subordinate to an aircraft's primary mission, special care should be made to avoid direct tasking, but instead communicate opportunities.

Synchronizing Information

Without a system in place to ensure aircraft reporting is rapidly communicated and integrated with other sources of information, results would benefit analysis, but fall short of actionable, decision-quality information. The INFTREP process, while mitigating the loss of some critical information, does not take full advantage of modern

networked capabilities to integrate with post-mission reporting as an end-to-end reporting network. Chat tools have sufficed to a limited extent to pass inflight information, but the result exacerbates the existing problem of individual units not being able to find the right information at the right place and time. The time-intensive search process to find relevant post-mission reporting and filter irrelevant data further prevents full utility for potential customers.

In order to provide information when it is needed most and allow detailed reporting of the most critical events for full integration, the CFACC's mission reporting process should transition from its legacy mission-centric narrative to an event-based system. This thesis has documented a process where detailed reporting of an event, depending on the length of an individual mission, can take 10 hours or longer. Production timelines can further extend that timeline for a finished and correlated product several more hours. In the interim, the INFLTREP, if passed, provides cursory information that is visible to a relatively small population. Additionally, transmission of the most important event in a MISREP must wait until the full product has been drafted, further slowing the passage of details which may be time-sensitive.

In an event-driven reporting process, detailed reporting would start with inflight reporting, allow for amplifying information from supporting elements, and conclude with post-mission reporting from the collection platform and in-depth analysis from the squadron, wing, and CAOC. Under the this concept, an INFLTREP, identified by the aircraft's ATO mission number, would be inputted by the receiving agency into the MISREP database instead of internet chat. As the initial report is received, elements within the CAOC ISRD and ground or maritime analysis agencies are able to seek and

provide amplifying information and direct actions as necessary. Once the aircraft has landed, squadron intelligence personnel, with INFLTREPs in hand, are able to lead a more effective intelligence debrief and report the most critical information incrementally. In effect, a two to four page MISREP would be replaced by multiple event entries, disseminated individually and in order of importance.

Facilitation of event reporting would require modifications to the MAT database that build on its ability to allow direct entry of information. First, event submission access would need to be granted to ASOCs and CRCs, along with a system to declare a unique event number associated with the aircraft's mission number. Second, event entry types would need to be clarified in accordance with a revised IRD to reduce the number of reportable event types from 20 or more to a list more consistent with operational, hostile, or other event types already referenced. Third, the reporting system would need to be tailored for accurate filtering by geographic area, event type, and reporting unit so that participants can limit visible reporting to their respective requirements. Fourth, to provide higher-fidelity understanding and assessment, additional information such as video, imagery, and Microsoft Office attachments should be supported so that potentially valuable information is not left behind. Finally, interoperability should be considered so that MAT event reports could be automatically ingested by other reporting databases operating over multiple levels of classification.

Incorporation of the changes advocated above into appropriate doctrine, such as a multi-service tactics, techniques, and procedures manual produced by the Air Sea Land Application Center, would provide authoritative guidance across multiple combatant commands. In order to avoid a gradual creep of requirements caused by successive

deployment rotations, joint guidance would provide long-term unified effort to cultivate successful mission reporting. Further, a single concept to unify purpose, requirements, means, and ways would be a vital resource for academic training, exercise refinement, and operational employment.

Although technical and doctrinal changes such as those advocated above incur monetary expense, the result is a comprehensive reporting system that allows detailed and clarified reporting to be communicated while still actionable. Enabled by an enhanced understanding of the purposes and requirements of mission reporting, disparate elements would be able to amplify and exploit dynamic events, ultimately improving awareness and understanding of the operating environment.

Recommendations for Further Study

During the course of research and analysis, several potential topics of further study have been identified which fell outside the scope or expertise of this thesis.

Full utilization of the joint community requires sharing of available information, within the limits of security guidance. Developing programming techniques have facilitated the development of meta-tagging, or identification of data characteristics associated with elements of information. Taken to logical limits, meta-tagging could be used to facilitate cross-domain dissemination. As events are recorded, automatically or manually linking classification could be used to create a single database for all event types so that individual users only see information appropriate for their level of access. As future systems enable direct datalink of radar, electronic warfare, or imagery, meta-tagging could further facilitate real-time information sharing with reduced manual manipulation to slow down exploitation opportunities.

Additionally, as databasing solutions are implemented and integrated, study should be given toward a methodology to automatically link air and ground events based on characteristics such as time and location. By developing criteria to evaluate linkages, analysts would have the ability to create a form of link diagram to determine the cause and effect relationship between air and ground events. In order to support an integrated common operational picture, future study should address a database structure that is interoperable with the Global Command and Control System, joint tactical datalinks, and the Distributed Common Ground System Integration Backbone. Beyond an improved understanding of the battlespace, component staffs could potentially be better able to assess the effects of air operations.

Finally, the reporting system discussed in this thesis is applicable only to aircraft under the control of the CFACC. Although the CAOC attempts to monitor and support other aircraft operating within the theater to ensure safety of flight and mitigate risks, mission reporting among the entire joint force is not conducted under a uniform standard. As improvements are made to the CFACC's reporting system, additional study is warranted to determine if it has benefits which would mandate adoption as the sole reporting system for all aviation assets within a theater. While this would limit the autonomy of other components to devise a reporting system specific to their own purposes, it could lead to a unified reporting structure that would reduce the amount of time spent by analysts to find credible reporting. Additionally, a common system would eliminate the uncertainty caused by not knowing whether all potential sources of information have been included.

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